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The Crawford County Dairy Association (1871)
The Pennsylvania Dairy Association (1874)
The Pennsylvania Dairy Union (1898)
The Pennsylvania Livestock Breeders' and Dairymen's Assn. (1916)

REPORT

of

FOURTH ANNUAL MEETING

January 23, 1929

HARRISBURG, PA.

E. B. FITTS, President, State College, Pa.
ROBERT F. BRINTON, Secretary-Treasurer, West Chester, Pa.

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The Dairy Industry in Pennsylvania During 1928

E. B. FITTS

President Pennsylvania Dairymen's Association

In opening this, the fourth annual meeting of the Pennsylvania Dairymen's Association, I wish to extend a cordial greeting and welcome to all members both old and new, who are present, and also to visitors and friends. We are glad you are here and trust that you will not only get something worth while from the meeting, but also that you may contribute something that will aid in making this meeting constructive and helpful to the dairy industry.

I shall briefly review the work of the Association for the past year and comment on some phases of the industry as it exists within our State.

I believe I am justified in saying that the Association has had a successful year. Its activities have been numerous, even though it did not have the legislative problems to deal with that must always have consideration during the time the legislature is in session.

The annual meeting in Harrisburg last year in point of attendance and interest was perhaps the most successful ever held. The attendance at the various sessions ranged from 300 to 500 and the interest was active throughout. The banquet was an enjoyable affair and 450 tickets were sold for this event. More tickets could have been sold had there been room.

In addition to the annual meeting, there was a spring meeting held at State College in May in connection with the Penn State Dairy Exposition. This meeting was well attended by farmers from the central section of the State.

In order to stimulate interest in greater efficiency in production, the Association offered prize ribbons to all cow testing Association members whose herds averaged more than 300 pounds of butter fat during the year. Five hundred and forty-two (542) Association members won a place in the honor roll and were awarded ribbons.

The Secretary took a leading part in arranging for a delegation of dairymen to go to Washington, D. C., to attend a hearing on Federal Appropriations for bovine tuberculosis test-

ing work. The Secretary and President have also kept in touch with other bills before Congress and have used their influence to further the dairy interests.

The membership list now includes more than 400 names representing all branches of the dairy industry. The list has been set up on addressograph plates which will materially assist the Secretary in his work.

Five hundred copies of the Annual Report were printed and mailed to the membership. This Report contained all the addresses given at the meeting and data on other proceedings, also a list of members, a list of "Honor Roll" prize winners and the constitution and by-laws of the Association.

In addition to the specific activities mentioned, this Association has given support to the extension of cooperative marketing, to the dairy improvement program of the extension service of the Pennsylvania State College and to the Pennsylvania Department of Agriculture in its program of elimination of disease from the herds of our State.

IMPORTANCE OF THE DAIRY INDUSTRY IN PENNSYLVANIA

In a recent report on the national scope and magnitude of the dairy industry by A. M. Loomis, Secretary of the National Dairy Federation, he calls it a "Thirty Billion Dollar Industry". This includes the capital invested in dairy farms and dairy manufacturing plants. In addition, there are about 40 other industries: feed dealers, implement makers, etc., which are more or less dependent upon the dairy industry.

Pennsylvania contributes her full share to this stupendous sum. Our State ranks fifth among the States in volume of milk produced and stands in third place in value of dairy products. In Ice Cream manufacture it holds first place. Dairying provides the main source of income on more than half the farms of our State and is an important source of income on a majority of those remaining. The farm business of the State is largely organized around and centers in the dairy, and farm prosperity seems closely linked with dairy cows and dairy farming. The type and character of our farms, coupled with the perishable nature of dairy products and our nearness to markets, would indicate that the producing of milk must be a very important part of our agriculture for many years to come.

PRESENT STATUS OF THE INDUSTRY

Within the State the condition of the industry has been good. Generally favorable conditions have prevailed and prices

have been well maintained. Hay and forage crops were about normal and pastures were good, especially in the latter part of the season.

The average value of dairy cattle for the year, as reported by the Pennsylvania Department of Agriculture, rose to a new high level, $103.00 per head. In 1870 the average value was $20.24. This high value of dairy cattle, together with fair prices for milk, has stimulated the raising of more calves and some increase in the cow population seems imminent. The weeding out of low producing cows, however, and the further extension of disease elimination on the area basis, will tend to prevent any marked increase.

The market milk area has extended into some new territory, especially in the central and western part of the State.

The industry is making very rapid strides all along the line in our State. One has but to pause a moment and think of conditions as they were only a very few years ago to realize how great this change really is. I feel that it can be said without danger of contradiction, that dairying in Pennsylvania in all its branches, production, transportation, manufacturing and distribution, is making more rapid strides in bettering its condition than any other comparable industry. This is due largely to scientific research and its practical application, to cooperative effort, and to good leadership. I would repeat here a general statement made at the opening of the meeting last year. "A general Survey of the Status of the industry would seem to justify the statement that it is entirely solvent with a large excess of assets over liabilities".

PURE BRED CATTLE

Pennsylvania continues a leader among the States in the number of breeders of pure bred cattle, ranking in third place. There are in Pennsylvania, 3 State, 3 District and 58 County breeders' Associations each with a definite program of breed improvement. Breeders from other States continue to look to Pennsylvania as a reliable source of pure bred cattle. We believe our breeders have generally very high ideals in mind of both type and production in dairy cattle and that they are continually, through weeding and breeding, working towards that ideal.

DISEASE CONTROL

Marked progress was made in the program of eradication of bovine tuberculosis during the year. A report from the State

Bureau of Animal Industry gives the following information as of November 1, 1928.

	No. Herds	No. Cattle
Area testing plan	108,128	666,905
Herd testing plan	11,936	165,575
Total	120,064	832,480

This is an increase over last year of more than 100,000 cattle tested and under supervision. These figures indicate that two-thirds or more of the cattle in the State are tested and under supervision. There are 16 counties accredited on the area basis and 6 other counties fully tested. In addition, there are 26 additional counties with 25 to 75 percent of the cattle tested on the area basis.

There is a rapidly growing interest in the elimination of contagious abortion which causes an enormous loss in the herds of our State each year. The Bureau of Animal Industry reported on November 1st, that testing was being carried on in 1902 herds and that 600 additional herds have signed up to carry out the plan of the Bureau for the elimination of this disease. Ninety-nine (99) herd owners have received disease free certificates.

The splendid progress being made by our Bureau of Animal Industry in the control and elimination of these diseases, merits for the Bureau and cooperating agencies, our full commendation and support.

DAIRY CATTLE IMPROVEMENT

There are many agencies other than those mentioned that have as their object, the general improvement of our dairy cattle. The more important of these are perhaps the Cow Testing Associations, Bull Associations and Boys' and Girls' Calf Clubs. Following are brief statements on progress in these important projects during the year.

There was a considerable expansion in cow testing association work during the year. The number of associations increased from 67 on January 1st, 1928, to 75 on January 1st, 1929. There was an increase also in the average production per cow of both milk and butter fat. These 75 Associations have more than 2000 members owning 30,000 or more cows. The average milk production per cow was very nearly 8000 pounds. This is more than 3000 pounds above the production of the average cow of the State. In butter fat production the goal in Association work is a yearly average of 300 pounds per cow. Last year the average of *all* cows in Association work was above this mark.

Since 1925 the Pennsylvania Dairymen's Association has offered a prize ribbon each year to each dairyman in cow testing associations whose herd averaged 300 or more pounds of butter fat. In that year 301 dairymen qualified. This year 724 dairymen will receive ribbons. In order to stimulate continued interest, the ribbons are awarded in three colors, red, blue and purple. A red ribbon indicates average production of 300 to 350 pounds of butter fat, a blue ribbon an average production of 350 to 400 pounds butter fat, and a purple ribbon an average production above 400 pounds butter fat.

The following table, based on the previous year's production, shows comparison for each year:

	1926	1927	1928	1929
Red Ribbons	210	246	340	449
Blue Ribbons	73	96	148	202
Purple Ribbons	18	35	54	73
	301	377	542	724

This is a gain of 34 percent above last year and of 141 percent above 1926. I believe the awarding of these ribbons to be a constructive association activity and suggest its continuance. The number of herds qualifying, however, is getting so large that the purchase of ribbons is becoming somewhat of a financial burden to the association and it is possible that it will be necessary to modify the plan or to raise the minimum standard.

Pennsylvania continues to head all States in its number of cooperative bull Associations. On January 1st, there were 66 Associations in operation. These Associations have nearly 1000 members and own 252 bulls. Each of these bulls was carefully selected for both type and inherited production. They are being bred to 10,000 or more cows. These associations exert a strong influence towards better breeding in each community in which they operate.

I believe these bull associations are having a far reaching effect toward continuous improvement in the type and working ability of our dairy cattle.

A common weakness in dairy cattle breeding lies in the fact that most bulls are killed before their value becomes known. The bull association, through exchange, provides for keeping all bulls until their daughters come into milk and their value proved. I would suggest to this association that they recognize each year by suitable ribbon, all proved bulls reported through systematic cow testing records.

The boys' and girls' calf club work expanded considerably during the year. This project seeks to interest the boy and girl in dairy work through aiding them in getting a well bred calf of good type and in instructing them in proper methods of feed and care. The number of clubs increased during the year from 57 clubs reported last year to 82.

COOPERATIVE MARKETING

The cooperative marketing movement continues to spread among the dairy farmers of Pennsylvania. There are three great cooperative dairy marketing organizations operating in our State; the Interstate Milk Producers' Association, the Dairymen's Cooperative Sales Company, and the Dairymen's League Cooperative Association, Inc. Reports from these associations show the year to have been one of progress. There has been some extension of territory covered and an increase in membership. Production has become more uniform, quality of milk has improved and prices are tending towards greater stability. The demand for higher quality milk increased and progress was made toward the general adoption of standards of grades for milk.

These associations are pointing and leading the way toward better conditions in dairying. Their leaders are blazing a new trail toward a condition in dairying that is already bringing benefits to the producer of milk, to the manufacturer and distributor, and to the consumer.

OTHER AGENCIES

There are many other agencies operating for the benefit and improvement of the dairy industry. Of these, I will mention but a few, the Pennsylvania State College, the Philadelphia Inter-State Dairy Council, the Pittsburgh Dairy Council, the State Chamber of Commerce and the Agricultural and Dairy Press.

The Pennsylvania Dairymen's Association embraces all branches of the industry and should function as the co-ordinating agency through which the industry as a whole should make its needs and desires known. Our Legislature is now in session and matters of importance and concern to our industry will come before that body for consideration. We should not fail to let them know our stand on all questions of concern to us.

In conclusion, I wish to thank the officers of the Association and the various committees for their assistance during the year and to especially commend the secretary, Mr. Robert F. Brinton, for his untiring zeal and constructive work during the year.

Thirteen Years of Dairying

HUGH FERGUS
Amity Farm, Slippery Rock, Pa.
Read by E. S. INGRAM

This will have to be a kind of dual speech—I will do the writing and the man you see before you will do the delivering. Ten years ago when "flu" was so prevalent and I had it, I was able to get out of bed after about a week of it and go to work although I was terribly weak for awhile. This time I took it the Friday before Xmas and thought I could get away with the same thing. I felt pretty good but weak so thought I could help milk and do some of the light work around the barn. The result was an attack of pneumonia which still has me in its grip. This speech will be written while I am propped up in bed or a big rocker. I would like to be there today to renew a lot of old acquaintances and to hear the talks, especially the one of Mr. Fraser, whose writings I have always enjoyed reading in Hoard's Dairyman. I would be glad to have him stop and see us some summer when he is rambling and writing his way through the East.

It just lacks about five weeks of being 13 years since the good wife and I, married about 6 months, with a total capital of $4000 landed here at Amity Farm, a farm of 143 acres which I might say is really about 120 acres for 23 acres of it is in rough woodland mostly inaccessible by an impassable creek. I expect our wonder was like a good many other young couples who go in debt, viz. whether we or the sheriff would win out. Well so far we are ahead of the sheriff and although we are not out of debt my annual inventory which I try to be conservative on, shows us several thousand dollars further ahead of the game than we were 13 years ago. In addition, four girls and a boy that we did not have then.

During this time we (when I say "we" I mean the good wife and I) have had in mind several aims, among the most important of which are these: (1) To make some permanent improvement on our farm every year. (2) To constantly improve the fertility of the land. (3) To try to work out the most profitable rotation of crops. (4) Through the use of good bulls and the cow testing association to raise our herd average year by year. (5) To better the market for our farm products. (6) To do

the most work with the least labor and at the least labor cost. I will try to take these up in their order and in detail.

When we bought Amity Farm we might have gone ahead and paid off the farm debt as fast as possible, letting the buildings go and making no improvements of any kind; but when we saw we were having no trouble keeping the sheriff away we decided that when we were yet young and had more capacity for work we had better try to make some needed improvements every year even though we would be longer in getting out of debt. An inventory every year would show us how we stood anyhow. One of the first things we did, or the second year we were here we sold the timber on 15 acres of land adjoining our permanent pasture. I only got $250 for it but that was all it was worth, being mostly birch, elm, sycamore and basswood. In two years a heavy blue grass sod came up and these 15 acres are now my best pasture. The same year I cleared seven acres of land of thorn apples, stones, and stumps, the former owner had used for pasture, that was surrounded on two sides by good cultivated land of my own and on the other two sides by a neighbor's land. In addition to the fence it took to surround it there was a 1400 foot lane fenced on both sides to reach it. This had grown up with saplings and brush so high and dense that some places one could not see through it. In addition constant tramping back and forth by the cattle had worn a path that washed so badly in some places that the scars are still there after 12 years. These seven acres and the lane are now some of my best cultivated land, some years the product of which would more than pay the interest on the mortgage. The last couple of years we cleared a three-acre piece of rough pasture and turned it into a cultivated field adjoining. Counting the fence on both sides of a lane to reach it we had about 3000 feet of fence to keep up and mowed. This piece had more cingfoil than grass and in addition thorn bushes and scrub trees up to six inches in diameter and the whole would not have pastured a cow for a week. After manuring, plowing, liming, and fertilizing, this is now good producing ground.

Other improvements we have made from year to year are the laying of an average of 2000 feet of tile drain every year in both the cultivated fields and pasture. We started off first with the places that were so wet they would hardly grow frog grass and now we are working on those places that keep a fellow back a few days from plowing in the spring. I always have some tile on hand for an odd job to work at. Perhaps a tip on covering tile that I learned from my own experience will help some of you

men. In the first place have as few outlets as possible, then try to keep them open. I have often run a tile a couple of hundred feet to save an extra outlet. When we are digging we throw all the dirt below plow depth back at least a foot from the edge of the ditch. This is the dirt that makes your top soil wet. Our standard depth is 2½ feet. When you get the bottom smooth and the tile laid take the shovel and cover the tile two or three inches with the top black soil to hold it in place. The old idea was then to break up about six inches of stone and put on top of this but we seldom have time for this so instead we take a steady horse and the walking plow. Set the walking plow so the horse can walk on the edge of the ditch. Then plow up one side of your ditch and down the other, plowing in the black surface soil. Then top it out with the yellow soil from the bottom of your ditch. This don't leave quite as smooth a job as filling in by hand but it certainly does a quicker job and saves a lot of expensive hand labor. We nearly always ditch in a field that is either plowed or going to be plowed so by the time the crop is planted you will hardly find the ditch.

Other improvements made for permanence have been a straw shed addition to the barn, 30x36 ft., a 12x36 ft. metal silo, a garage, a 14x20 ft. hollow block milk house, a 20x20 ft. poultry house, a 10x10 ft. poultry house for my married hired man, a 30x60 ft. machine shed. New matched siding on most of the barn, added 40 windows to the few that were already in the barn, put in a concrete floor and 24 steel stanchions in the part of the barn where we milk, cemented the cellar in the house and put water in the house and barn. Also started a young orchard of about 25 trees of various kinds of fruit for our own use. These buildings have all been built with good cement walls, matched siding, a good roof and all painted so they will be permanent and make the farm look thrifty whether it is or not. They have not been very expensive for the hired help and myself have done most of the building work. Without looking it up I would say my total carpenter and other outside labor bill has not been over $300.

Before I bought a farm I always had it in my head to sell off as few crops as possible, especially in the way of hay and straw. That has been my policy on Amity Farm during these 13 years. I have sold a little hay but have bought more than I sold a couple of years when I had more stock than hay. Every year we raise more grain than the livestock eat so I have about an average of about $300 worth to sell. However, we easily make up for this in 2500 to 3000 pounds of protein con-

centrates such as cottonseed meal, oil meal, soy bean meal and gluten meal that we buy every month and mix with home grown grains. A couple of years we were low in livestock but rather than sell hay I threshed timothy for seed and second crop clover for seed and scattered the straw where it would plow under. Another year when we had 2700 bu. of ear corn we husked the most of it off the stalk and plowed under the stover.

In addition to conserving our fertility in this way we buy five to seven tons of fertilizer each year (mostly acid phosphate) for both field crops and pasture. In addition we have been applying lime most every year to some of the fields and the pasture. Just now we have a 50-ton kiln ready to fire. There is a lot of work in building these and spreading them. I can get ground limestone for $3 to $3.50 per ton and have about decided in the future to stick to this form of lime. For the past three weeks when it has been fit we have been putting the ground limestone on the wheat which will be seeded to clover in the spring. I have found an easy way to apply it is to buy a wagon load at a time and as it is used run the wagon out of the barn on days you want to spread it. Fill up the manure spreader box with manure. By weighing up a few shovelfuls of lime and knowing the number of loads per acre the spreader runs, you can put on the spreader load of manure just about the amount you want. Since the lime at the quarry runs out of a bin into the wagon this means only one handling of the lime by what I call, and I expect Mr. Fraser in his talk will call, expensive hand labor. This is an easy method of application either on field crops or pasture and can be done in the less busy winter season.

This conservation of fertility has resulted in present yields that average something like these: 60 to 70 bushels of oats (by weight) per acre, 100 bu. ear corn, 3 to 4 tons of hay (first and second cuttings)—but wheat! I have tried my best to get good wheat crops and I don't think my average has been over 20 bu. per acre. I cut it out two years and last fall a year ago thought I would try it again. Now you good wheat growers, should this grow wheat? Plowed the ground before September 1, dragged each day as it was plowed, harrowed after each rain until planting time, sent to Hoffman's for Penna. 44 wheat, planted about September 15 with 300 pounds complete fertilizer per acre. Early in the winter before January 1, I top dressed with 8 loads manure and 1500 lbs. ground limestone per acre. Now how much wheat should that make per acre? Well it made 13 bushels and 2 bushels of that was cheat and shrivelled wheat. I think I have my last crop of wheat in the ground now and hereafter will confine myself to a different rotation which will come under

the next part of my talk, viz. "Rotations." Last summer the 50 acres of pasture pastured 35 cattle and 3 horses.

I have been trying ever since I came here to strike the most profitable rotation of crops. I am going to give you all the ones I have tried that I can remember without much discussion on any of them, except the one we are going to try next and one which I hope will be our permanent one. I think "Rotations" would make an excellent topic for Grange discussion some night. Well here are some of the ones we have used:

1. Corn, corn, oats, clover.
2. Corn, wheat, clover.
3. Corn, oats seeded to sweet clover for fall pasture. This plowed down in November or December and seeded to oats the third year, and these oats seeded to red and alsike clover for the fourth year of the rotation.
4. Corn, oats, wheat, clover.
5. Corn, oats, clover, wheat, clover.
6. Corn, oats, sweet clover for pasture.

I have tried this last one twice on well inoculated and limed land but on this Volusia soil the sweet clover has frozen out badly both winters. I didn't trust the sweet clover so had planted red and alsike. Both years we cut it for hay and there was just enough sweet clover left to make hay that the hired men and I have nicknamed "brush" hay.

Now the rotation we are going to try next and I hope will be a permanent one is corn, oats, and clover. All the previous rotations were run on eight fields. My farm is divided by a public road. On account of topography it is necessary to have three fields below the road or on the lower part of my farm containing 9 acres, 10 acres and 12 acres. Above the road on the higher part are 43 acres which we will divide into an 18 acre field, a 13 acre field and a 12 acre field to run in rotation with the three above mentioned fields. This will approximate 25 acres of each crop every year. Wheat has always interfered with the hay crop in summer and planting time in the fall has interfered with the silage and corn crop harvest. These three crops have always been my best paying ones. If we have a surplus of corn there has always been a good and ready market for it right here at the farm. I have been planting Cornellian oats for several years and have always by a little local advertising been able to sell my surplus at seed prices. Now, we don't seem

to be able to make a success of sweet clover so will cut the clover field below the road first, and then it will come on in time for pasturing in September and October. The cows can harvest this as easily as we can and again save labor.

We have found a new way of handling our corn crop which we like very much. I have always tested my field corn for germination which insures us a good stand. Then I use a check row planter so we can work the fields both ways. That is, always until last year. In the spring when I got the planter out part of the check row attachment was missing. Later in the summer we found it but could not find it that day. Since it would take several days to get new parts I decided to plant the old way, viz. a stalk to a place and work one way of the field. Well you all know the weedy corn fields last fall and we had our full share.

The corn borer scare that started a couple of years ago made us wonder whether we would have to cut out field corn altogether on account of having the stalks to destroy. A couple of years before when the ensilage corn was a little short we tried snapping off the ears from the field corn and dropping them in the row. Then we cut the stover and mixed it in with the silage. About one load of stover to two of ensilage. The stover was a little dry and apparently the ensilage did not have enough sap in it to moisten it enough to make it keep good. So two years ago (1927) I thought I would try putting field corn in one hopper of the planter and ensilage in the other hopper. This gave us two rows of field corn and two rows of ensilage alternately across the field. You all know there is a certain stage in the ripening of field corn where the ear is ripe and the stalk green. As near as we could we pulled the ears off the field corn at this stage and put the stover along with the silage into the silos. Always loading a row of field stover and a row of ensilage or two rows of each on the wagon. This made them both mix and keep well. We fill our own silo with one team and one or two men to help. This strings our silo filling season over about three weeks for the two 12x36 ft. silos we have. Last year we used two varieties of field corn and two of ensilage. But next year I am going to use three of each. First is an early variety of yellow field corn I got up in Mercer county, 15 miles north of our farm. I will grow this with West Branch Sweepstakes ensilage. My second two varieties will be a medium early and production variety of local corn mixed with Lancaster County Sure Crop. These two will form the bulk of the crop. The late varieties will be a late maturing local variety mixed with Eureka ensilage. When we get all the ensilage and stover

off the field we husk the ears, throw them in convenient piles and in two or three days after they dry a little they are ready to crib. The ears with the husks on can lay out for three weeks even in adverse weather with little spoilage. This method of handling corn certainly saves a lot of work. Anyone from a 12-year old boy to an old man can snap the ears off rapidly. There is no field corn fodder to set up, later tear down, husk and tie up again, then still later haul to the barn, heave up into the highest part of the barn, later to be thrown back down and fed the cows. Under the old system they ate little more than half the stover. Under this system they eat it all and enjoy it and instead of a fellow having a hard time keeping his religion handling the stalks in the manure, he does not have to handle any. This system too will give the man with a small farm a chance to grow more corn to husk. Under the old system say he had a 10x36 ft. silo. He planted about four acres of ensilage to fill it and had four acres to husk. Under this system he can plant 2½ acres of ensilage along with 2½ acres of field corn. This will give him 1½ acres more field corn to husk and one acre less field corn to set up and husk. Here is where my biggest surprise was and I think it will be a surprise to you men.

I had 14 cows in milk for two full years. The last year when we used straight ensilage and fed corn stover and the first year of the ensilage-stover combination in the silo. The last year under the old system these 14 produced an average of 7009 pounds milk and 342 lbs. of butterfat apiece. The next year, the first under the new system these same 14 averaged 7833 lbs. milk and 389 lbs. of butter fat apiece. A total gain for the 14 of 11533 lbs. of milk and 652 lbs. of butter fat. The grain mixture and proportion of grain to milk was practically the same both years.

The cow testing association is really responsible for all I have accomplished in dairying. During the four years I attended Penn State I specialized in Animal Husbandry with a few dairy subjects on the side. My idea being if I ever got a farm to fatten beef cattle and hogs. When I graduated there were no jobs along my line open. After working a couple of months as a hired man during harvest, I heard of a job as cow tester in the Laurel Hill Association in Bradford County, where I must say there are some Real (with a capital R) dairymen. I got the job as cow tester, worked the full year at it, read all the dairying I could get hold of and asked lots of questions and I must say with all due regards for Penn State I just added about two years of post graduate to my education that year.

Following this I worked for the U. S. Dairy Division for a year and a half organizing cow testing associations in New England and in Delaware. I had brought milk sheets, a cow testing association herd book and my old Bradford county Babcock tester with me.

Until the Grove City Association started I kept my own records and during all these years I have weighed every milking from every cow even though I had her only a month and have a complete cow testing association record on every one of them. Here is what I can't understand. A man will belong to the church and help support it year after year. (I am not saying I don't too for I do.) He will pay his taxes regularly year after year. If he is a tobacco user he will spend the price of a month's dues in the cow testing association every month for this little habit and never turn a hair. Then he will call himself a dairyman and give the county agent or other extension man the stiffest kind of an argument against joining a cow testing association which will do more to add to his finances than anyone of the things I have mentioned above. Mr. Gearhart, in charge of the work in this state, tells me I have the longest continuous cow testing association record in the state. If that is true, as long as I am in the dairy business, no dairyman in Pennsylvania is going to take that record away from me. Here is how much it has done for me in spite of the fact that we have had abortion in the herd for several years and such a long run of bull calves and sterility that I have owned 140 different cows during these years. The first year we were here our 16 cows averaged 5016 lbs. of milk and 250.5 lbs. of butter fat at a profit of $37.30 each above cost of feed. Our last full year, April 1, 1927 to April 1, 1928 our 24 cows averaged 7331 lbs. of milk, 360 lbs. of butter fat and a profit of $227.02 each above the cost of feed. Part of this high profit was due to a much better market than we had thirteen years ago but I will have to give the cow testing association credit for opening my eyes to the profit from a better market even though it took about 9 years to do it. If you will notice, two cows last year made me nearly as much profit above the cost of feed as the whole herd did the first year. Putting it another way, the amount of profit I made from one cow last year above the profit I made from one cow the first year will pay my dues in the association for four years.

It was the cow testing association about seven or eight years ago that induced me to add to our present size of herd. We were keeping on an average of about 15 then and about that time too was when the abortion broke out with us. The farm

had gotten to the point where it was producing more roughage and grain than we were able to use on the farm. We had the old market yet but the herd was good enough to be returning $90 above the cost of feed or about two dollars for every dollars worth of feed they were eating. So I thought "Why not get more cows and sell this surplus feed to them? They will pay me $30 a ton for hay, $10 for silage, one dollar a bushel for my ear corn and oats." The result was that we increased the herd from 16 to 25 cows in one year with a corresponding increase in profits for the farm.

One dream we had badly shattered was that of having a pure bred herd. We started off with two pure bred heifers and later had our number up to a dozen. About this time abortion broke out in the herd. The ones that did not abort seemed to feel that we wanted to raise a herd of bulls. I kept account of the living ones for awhile and we had 27 bull calves out of 32. We were losing ground on the pure breds along with the sterility, and I never had the crust to sell anyone the disease so we have gradually eliminated the pure breds altogether. This is not an argument for anyone else to quit or to never start in them, but I would suggest that if you do not have abortion to be mighty careful. When you don't have it or are only getting a start in abortion I would say test. It is the hardest problem I have to contend with right now, is to know what to do with my herd in regard to it. If I had two farms so I could send my heifers to the one clean one before they are six months of age the problem would be a simple one.

According to our system of feeding, abortion has never hurt our production very much. In fact some of the cows that have aborted have made their best records the year they lost their calves. I remember several years ago when about half the herd lost their calves, the cows that aborted averaged 332 pounds of butter fat and the ones that calved normally averaged 327 pounds. One of my best ones aborted last January 3 and has produced up until I put her dry in December, 473 pounds of butter fat.

Our feeding system is this: We feed grain during the entire year, on pasture for the best two months about three-fourth as much as during the balance of the year. When a cow aborts I have the veterinarian remove the afterbirth if it does not come away naturally about 24 hours after the calf is dropped. We usually give her a condiment for two or three weeks after the calf is dropped. As soon as she can stand it we feed her grain, one half heavier than if she had dropped her calf normally. We

keep this up for six or eight weeks. My idea is that this is the grain she should have had when she would have stood dry. In about 10 or 12 weeks if she seems clean in her genital organs we have her bred. If she doesn't "catch" the first time we try her again. If she fails this time I have the veterinarian examine her for ovary trouble and treat her if any is present. When he thinks she is ready we try her again and if she does not breed the veterinarian repeats the treatment or advises that she will probably never breed. By using this system we get about an 80 per cent crop of calves every year and do not have cows stand sterile a long time. By watching the cow testing herd book on the sterile ones we know when they cease to be profitable and pass them on to the butcher.

I do not think I am any lazier than the average man, but I do hate to do needless work and am always looking for either an easier or a cheaper way. We have always tried to work hours here on Amity Farm so that farming will not seem a drudgery. Our regular hours all these years have been to get out of bed at 5:20 a. m. As soon as they can be assembled the cows are milked. The only feeding before breakfast outside of grain for the cows is hay and grain for the horses in winter. After milking comes breakfast then the regular routine of the day's farm work. Each fellow has his work and knows to go ahead and do it. The same man does all the teaming. From 12:00 to 1:00 p. m. for the noon hour and dinner. In the evening chores and milking are started in time to finish up everything between 6:00 and 6:15 p. m.

We keep the cows in an enclosed part of the barn, 36x64 ft. in size and the heifers and young stock in an adjoining part of the barn separated by bars and a fence, 30x36 ft. in size. Here they have salt and running water before them all the time. A 94 ft. long feed rack runs the entire length of this enclosure from which the cattle get all their hay and silage. It is bedded down once a day. The only time the cows are not in this enclosure in winter is when they are driven into the part of the barn where the concrete floor and stanchions are, to be milked and to receive their grain. That means only about a dozen piles of manure a day to throw out. This means a big saving in time every day cleaning stables as you men know who clean stables for 24 cows. Outside of those few piles dropped while they are in the milking barn all the manure is handled only by hand the one time it is pitched on the spreader. The shed being warm there are so many days we can haul manure when the man who stores it out-

side cannot. Outside of Sunday we hauled every day the first 16 days of this month.

By having our own feed grinder we can grind the feed and mix as we grind quicker and much cheaper than we could sack the grain and make the trip one way to the commercial grinder.

We have had a tractor for ten years. Without having kept exact records I think when it is working it costs as much to do field work with the tractors as the team but for so much of the time we do not need two teams and a tractor is better than two teams when it is working. Then it can do a lot of work that the team cannot. We have our own ensilage cutter which it runs. I discovered about five years ago that having a man or men in the silo when filling with your own cutter is foolishness. We just use the first joint or bucket of the distributor pipe, tie it so the silage will light in the center of the silo, shut the doors and let it blow. When nearly full we have to have a man in there to keep it level and from clogging up the pipe. The man who used to be in the silo can be using that time for something else.

Another convenience and labor saver we have had for two years is a 20″x32″ thresher with a self feeder, band cutter, wind stacker, and grain elevator attachments. Under the old custom system it took 16 men to do our threshing. Now two men can do it if you make several sets. I have threshed several loads myself when we could set the thresher where the grain elevator emptied into the grain bin. Under the old system we hauled grain for two weeks and heaved it all up into the grain mow. When the mow was nearly full we had to even get the good wife out to help pack the sheaves up against the hot slate roof at the top of the barn. We had to leave one mow empty to put the first straw in. Now when we are done hauling in we are done threshing and do not have two men chasing around the neighborhood for a week or ten days and coming home late to milk in order to get help for our threshing done.

The hay loader is another big labor saver. We use a six-foot mower. In the winter we top dress the meadows with manure. Thus far the hay has been so heavy that we take it right out of the swath and even then drive as slow as the team will walk in order to keep from covering up the men on the load.

Cows are the only kind of livestock we keep outside of 100 chickens that are kept more for our own use even though we have a total income from them of about $250 yearly.

We keep cows only for I figure that if we had several kinds livestock, while I was going from one kind to the other I could

be milking another cow. It takes just as long to go to town with the milk of six cows as 24. It takes just as long to crawl up in the hay mow, straw mow or silo for six as it does for 24 cows. In proportion one can scatter feed and care for 24 in less time per cow than for six. We can keep a much better bull for 24 than for 6.

Less Work—More Money

WILBER J. FRASER

Professor of Dairy Farming, University of Illinois

No fact in dairydom has been so widely demonstrated or is so widely accepted at the present time as that cows must be well fed to make a profit. Feeding trials have been conducted by several of the leading Experiment Stations which have definitely proved that production of many cows on farms can be greatly increased by the use of proper feeding methods.

Not only is there the matter of feeding cows for high production, but also the problem of feeding them at as low a cost as possible to consider. The feed cost on one dairy farm may be easily twice as great as that on the adjoining farm simply because feeds are used which are uneconomical, due either to high cost or poor milk producing qualities.

The proper balance between milk per acre and per cow is the thing we are after on strictly dairy farms, or that part of the farm that is devoted to dairying. This means that milk per acre is the thing we are after, if it is produced without too much labor. One can spend too much time in tilling the crops and too much time in taking care of the cows and thus make little profit. Milk per acre is a very significant thing on the dairy farm, and yet we seldom think of it in that way. We think of the yield of grain and alfalfa by the acre but we do not think of milk per acre.

There are two fundamentals upon which dairy farming rests. One is the production of the feed per acre, or efficient crops, and the other is the production of milk per cow or efficient cows. The result of these two properly combined is the most milk per acre that can be economically produced. If either one of these is low we cannot possibly get the best results. I have asked a great many dairymen how much milk they get per acre and I have never yet found one that figured it that way.

We have heard a great deal about high record cows. Only a short time ago the yearly record for butterfat was again broken by a cow that produced 1345 pounds. We talk about these high records a great deal, but it seems to me we do not pay enough attention to the production of the common ordinary cow. We are a little like the Sunday School boy who was interested in the American sport. His teacher asked him who it was that defeated the Phillistines and he said, "I don't know; I

don't keep no track of them bush league teams." It seems to me we have a great many bush league cows and bush league crops that we do not keep track of. We certainly are not going to get very far in economic production until we keep a record of the production of the rank and file of our cows.

Goal of Dairy Farming.—To the practical dairy farmer, the problem of the ration is not merely its technical composition of feeds to meet the requirements of the cow in making milk, but also its adaptability as a ration to fit his situation and circumstances. He must then fit his farming to that ration. The ration is to be produced as well as fed. In the whole business of dairying, there is as much necessity, economy, and profit in producing the proper ration in the right way as in choosing the suitable and efficient ration and feeding it under such conditions so as to secure the largest and best results. To state it another way, the fundamental basis and unchanging goal of dairy farming is the production of the most milk per cow and per acre at the least cost. This is a three horse team and the units must be evenly hitched and trained to pull together. It is in that setting that we should study rations. The meaning and effect of balanced rations may be illustrated from actual experience by a six years' test at the University of Illinois.

"*The Most Milk Per Acre Demonstration.*"—The purpose of this demonstration was to see how much milk and fat could be produced per acre of crops under ordinary farm conditions, all the feed being raised on the land. Twenty acres, all the land available for this purpose, were used. An average of 10.6 good grade cows were kept for the six years. They produced an average of 7,470 pounds milk and 262 pounds of fat per cow, making 3,888 pounds milk and 136 pounds fat per acre of land. This is from two to four times as much milk per acre as is produced on strictly dairy farms in Illinois.

The cows were made comfortable by being allowed to run loose in the barn except during feeding and milking time. During warm weather, they ran in a shaded yard. The housing and care were no better than most dairymen give their cows. This leaves the factor of feed as the only one necessarily different from those on most dairy farms. The methods were all economical and practical. The feed used in this demonstration was all home-grown, consisting mainly of corn silage and alfalfa with corn meal for the heavy producing cows and rye pasture for all cows during a few weeks in the spring and fall. In the main, though, the feeds grown were corn for silage and alfalfa for hay, because these two crops produce from two to four times as much

digestible nutrients per acre as other farm crops commonly raised, and when fed together form a very nearly balanced ration. Corn silage is high in carbohydrates and furnishes the much needed succulence, while alfalfa hay is high in protein and minerals which balance up the carbohydrates in the silage. These cows consumed an average of about 40 pounds corn silage, 16 pounds alfalfa hay, and 1 pound corn meal a day for the six years they were on the demonstration.

It was interesting to note that when these two crops—corn silage and alfalfa hay—were balanced in the ration, they produced almost three times as much milk per acre as was produced under the conditions found on northern Illinois dairy farms. What could the reason be? It could not be because of the corn silage, as that is a common feed in northern Illinois; therefore, it must be because of the alfalfa which was grown on about an equal acreage with corn. Following such a line of reasoning led to an examination of the census report, and it was found that the conditions of the country in regard to alfalfa and clover acreage was that one and one half percent of tillable areas were in alfalfa and two and three-fourths percent in clover. This furnishes the key note to explain the increase in yield of milk per acre obtained on the demonstration over the ordinary dairy farm.

Alfalfa Must Be of High Quality.—It will not do to say that the alfalfa fed on the demonstration was just alfalfa; it was rich, high quality hay. Bleached in the sun and raked when dry, ordinary alfalfa hay may be only the faded and tasteless semblance of alfalfa, the sticks and skeleton of the former plant that was rich and fat with nutriment and most inviting to the palate. Half its value may be gone and yet it may resemble alfalfa. The cows will not eat half enough of this poor stuff, and if they ate twice the ordinary weight of it, still it would not fill its place in the ration for its most valuable properties are gone or greatly reduced. It is no longer the good alfalfa hay of which we have been speaking.

The methods of handling alfalfa in this demonstration preserved its good qualities, but even then, we did not think of making the cows eat all their hay any more than we thought of not feeding them hay at all. We did not want them to grind up the non-nutritious stems, but to enjoy the protein rich leaves which make alfalfa king of the legumes for dairy cows.

Fundamental Values

The Cooperative purchasing service which more than 25,000 farmers are supplying themselves through the Eastern States Farmers' Exchange is based on sound principles.

The farmer must take every precaution to make sure that the raw materials he buys are of the quality best adapted to fill his requirements. He has not the equipment, nor the training, nor the time to investigate the quality of the ingredients which he buys in feed and fertilizer formulas, nor to check the proportions in which these ingredients are blended. Nor has he the time to get all the facts back of the seed offered him. Yet it is essential that he be certain of these important details, or the skill he applies to breeding and farming, and the pains he takes to getting the best price the market affords will produce money to cover the wastes incurred through defective selection of raw materials—feed, fertilizer, seed—rather than to increase profits.

But cooperating with their neighbors, more than 25,000 farmers have built a purchasing department which is equipped to ascertain the feed, fertilizer, and seed needs of its membership, and to make certain that the products it purchases for them are of the quality their needs demand.

Along with proper selection of raw materials goes economical handling of raw materials. This also farmers are able to obtain effectively cooperating through their Eastern States Farmers' Exchange. By grouping their orders, they buy as other manufacturers do—in carloads—and get costs still lower by trucking their materials to the farm for storage in buildings on which they pay taxes whether they are occupied or idle.

Thus through cooperation Eastern States farmers have adapted to their business the purchasing methods other manufacturers adopted years ago in order to take the first step toward increased profits—proper selection and economical handling of raw materials.

No farmer is too small and none too large to benefit from Eastern States service. If you are also thinking of trying the service which thousands are endorsing with their patronage, write the office for information.

Eastern States Farmers' Exchange

A non-stock, non-profit organization
owned and controlled by the
farmers it serves

Headquarters: Springfield, Massachusetts

ANNUAL MEETING

January 23, 1929

The Annual Business Meeting of the Pennsylvania Dairymen's Association was called to order in the Masonic Temple at Harrisburg, Pa., at 1.30 P. M. by President E. B. Fitts.

The minutes of the last Annual Meeting were approved as read and the Treasurer's report, which showed a balance of $96.52, was accepted and ordered filed with the minutes. The statement of F. M. Twining and I. Ralph Zollers, who had served as auditors of the Treasurer's report, was read and accepted.

A nominating committee composed of:

R. W. Balderston, W. S. Wise and H. O. Kimmel suggested the following persons to fill the various offices for the ensuing year:

President—Robert F. Brinton
First Vice-President—Dr. L. M. Thompson
Second Vice-President—M. T. Philips
Third Vice-President—W. F. Shrum
Secretary and Treasurer—R. H. Olmstead

There being but one nominee for each office, the Secretary was instructed to cast a ballot and they were declared elected.

A resolutions committee composed of:

F. M. Twining, Daniel S. Adams and H. B. Steele presented the resolutions attached hereto which passed unanimously except for resolution number 1, which passed by a narrow margin.

Under heading of new business the Secretary suggested that Section 1 of the By-Laws be changed to make the annual dues payable January 1st, instead of March 1st, of each year. This was followed by a motion regularly made, seconded and passed, that the change be made.

The President appointed the following men to represent the Dairymen's Association on the Farm Products Show Committee:

Robert F. Brinton, West Chester, Pa.
E. B. Fitts, State College, Pa.
Allen D. Miller, Susquehanna, Pa.

To represent the Association in the State Council of Agricultural Associations the President appointed a committee composed of:

W. S. Wise, Meadville, Pa.
R. H. Olmstead, State College, Pa.
Robert F. Brinton, West Chester, Pa.

There being no further business, the business meeting adjourned and the educational program was continued.

E. B. Fitts, *President*,
Robert F. Brinton, *Secretary*.

Resolutions Adopted at the 1929 Meeting of The Pennsylvania Dairymen's Association

1. *Whereas*: Serious losses are suffered by the livestock interests of Pennsylvania due to communicable diseases, and

Whereas: The present laws governing the admission of livestock to our State are not adequate to fully protect the livestock interest or prevent the admissions of animals carrying communicable diseases, therefore:

Be It Resolved: That, this Pennsylvania Dairymen's Association in Annual Meeting Assembled, urge the present Legislature to enact such additional legislation, covering the admission of livestock to Pennsylvania from other States and countries, as is necessary to fully protect our own livestock from outside contagion.

2. *Whereas*: The Pennsylvania Dairymen's Association realizing that oils and fats and the raw materials from which they are derived, now constitute the most important single group of agricultural imports, and

Whereas: The importation of fats and oils competes seriously with many products of domestic farms and especially with the products of American Dairymen, and,

Whereas: Importations of oils and fats into this country from the Phillipine Islands are exempted from adequate import duties, therefore,

Be It Resolved: That we urge upon our National Congress to provide adequate and equalized import duties on oils and fats, and equivalent duties on raw materials and urge further that no preferential duties be established with respect to commodity uses or with respect to the countries from which the various oils and fats are imported.

3. *Whereas*: At this time Butter Fat imported into this country in the form of cream pays only one-third as much import duty as Butter Fat in the form of Butter, therefore,

Be It Resolved: That we urge our National Congress to equalize the rates of duty on dairy products on the basis of their Butter Fat content.

4. *Whereas*: The average rate of import duties imposed on manufactured products now coming into this country is about 35% of the valuation, and,

Whereas: The average rate of import duties on agricultural products is only about 12% of the valuation, therefore,

Be It Resolved: That we urge a careful study of the tariff problem in relation to agricultural products and revision by our National Congress of tariff schedules to insure, to agriculture the same protection as that afforded to other industries.

5. *Whereas*: Great progress has already been made in eradication of tuberculosis from the dairy herds of Pennsylvania and,

Whereas: Many more dairymen are preparing to eradicate this disease from their herds in the next two years, therefore,

Be It Resolved: That the Pennsylvania Dairymen's Association urges the State Legislature to make adequate appropriation, necessary to care for the estimated needs for further indemnification for the next two years as has been outlined by the Department of Agriculture.

6. *Whereas*: The Pennsylvania Dairymen's Association commends the efforts that have been made by the State Department of Agriculture and the Pennsylvania State College to eradicate contagious abortion and other diseases of cattle from the herds of dairymen, and,

Whereas: There is still a great need for this work, therefore,

Be It Resolved: That we urge continuation of and further research by, appropriate Bureaus, or methods of prevention, eradication and cure of diseases to farm animals.

7. *Whereas*: Repeated emphasis is necessary to advance the dairy industry as in all other worthy endeavors, therefore,

Be It Resolved: That the Pennsylvania Dairymen's Association urge its members to cooperate with the educational efforts being conducted by the various Dairy Councils, the State Agricultural College and other properly recognized educational institutions to the end of bringing before all our citizens the health promoting and nutritional benefits to be derived from the free consumption of milk and its products.

8. *Whereas*: Certain dairy interests in their ardor to give publicity to their specific product have occasionally by direct statement or inference attempted to make adverse comparison with other dairy products, therefore,

Be It Resolved: That we view with alarm such tendencies and recommend that their efforts be discouraged and suppressed.

9. *Whereas*: The Pennsylvania State College owes as much obligation to agriculture as to any other industry, and,

Whereas: The present dairy equipment and dairy building erected in 1904 when the college had less than one-fourth its present enrollment is entirely inadequate to the needs of the dairy interests of the State, and,

Whereas: The importance of the Dairy Industry of Pennsylvania is on a par with or greater than in the states of Minnesota, Maryland, New York, Iowa, California, Washington, New Jersey, North Carolina, Oklahoma, Illinois and Kansas, in which states modern dairy buildings have recently been erected, therefore,

Be It Resolved: That we urge the present State Legislature to provide adequate appropriations for carrying on the program laid down by the Trustees of the College and we further urge that at least three hundred thousand dollars ($300,000.00) of the amount appropriated for buildings, be used for the construction of a new Dairy Building and at least fifty thousand dollars ($50,000.00) be expended for new equipment to bring our dairy department on a par with the needs of the Dairy Industry in Pennsylvania and with the equipment of other states.

10. To His Excellency, John S. Fisher,
Governor of the Commonwealth of Pennsylvania.

Whereas: The Farmers of the Commonwealth of Pennsylvania, during the past thirteen years, have developed a winter Farm Products Show, that is second to none in the whole United States, and,

Whereas: The facilities for housing this show at the present time are entirely inadequate, and,

Whereas: His Honor, Governor Fisher, has stated publicly that it is his desire to promote the cause of agriculture in Pennsylvania, by providing permanent and adequate home in Harrisburg, Pennsylvania, for the Pennsylvania Farm Products Show, and,

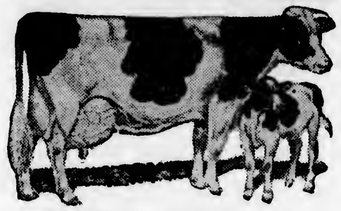
Whereas: The farm people of Pennsylvania have received the Governor's statements, as reported by the public press, with universal approval and enthusiasm, therefore ,

Be It Resolved: That the Pennsylvania Dairymen's Association heartily endorse this project of the State Government and commend the Governor for his progressive and sympathetic attitude toward agriculture, as manifested by his many acts since becoming Governor but especially by his approval of a budget sufficiently large to equip adequately and maintain, this Farmers' Winter Show.

The Committee

"Holsteins For Profit"

Holstein Milk



Vitality!

HOLSTEINS

1—Make More Milk

2—Make More Fat

3—Make More Profit

Breed Them

Show Them

Enjoy Them

The Penna. Federation

of

Holstein-Friesian Clubs

H. D. ALLEBACH, Pres.
H. E. ROBERTSON, Sec'y.

YORK, PA.

Arrangement and Remodeling of Dairy Barns

N. S. GRUBBS, Mount Holly, N. J.

Dairy barn arrangement has its place along with herd management in the economical production of clean milk. In Pennsylvania where milk production is the leading branch of agriculture, I find unusual interest in barn remodeling and the design of new buildings for dairy purposes.

When the investment in dairy buildings amounts to as much as $300 per cow, it follows that only high producing cattle should be permitted to remain in the herd. The carrying charges, including interest on investment, insurance, taxes, etc., is at least $30 per year per cow. This is based on a survey conducted among some cow testing associations in Pennsylvania. With this investment it also follows that properly arranged dairies justify the expenditure while on the other hand poorly arranged barns, regardless of the cost, are unprofitable.

There has been no time in history when the saving of labor on farms has been as important as during these last few years of what is known as "agricultural depression." Manufacturing industries have accomplished somewhat more than has agriculture in the economical use of labor. Yet the large industrial centers have been continually demanding more workers and are actually moving them from the farm to the cities at wages far in excess of those the farmer can pay.

With this scarcity of efficient labor on farms getting more and more acute each year since 1920, it has brought about the use of more and better labor-saving machines on farms. Most of us are fully acquainted with these labor-saving machines and what they have accomplished in reducing the number of men required to produce the foodstuffs of our country. Properly arranged buildings also reduce labor and increase labor income.

Due to the increasing demands for fluid milk by the cities many butter and cheese sections of the country have been called upon to supply this increase. Many farmers have been asking for suggestions in rearranging their buildings to meet the Board of Health recommendations. A study was made in New York State on nearly 1000 farms making detailed measurements on the arrangement and layout of all farm buildings with suggested changes the farmer would like to make to satisfy his preference in every detail.

As a result of this study it was found that many of our dairy barns are in a bad mess and much labor is wasted in unnecessary travel from one operation to another. The building arrangement may not be the most important problem on farms, yet on a dairy farm it should have more careful planning. According to time records, a farmer spends more hours caring for a cow than for any other animal and more time than he expends in caring for a whole acre of any crop he grows.

Many of the poorly arranged buildings now found on farms are not the planning of the present owner, but are the accumulated efforts of many past operators who have attempted rearranging and as a result we see today farmsteads with many small buildings with additions, lean-tos, ells, etc.

One has to visit but few barns to find many examples of bad locations of silos, granaries, hay chutes, milk houses, and the like. One stops and wonders how a man would do such a thing. A great many farmers are so used to working around in a barn with these disadvantages that they never notice it. Others realize the extra time consumed each day, but the time of making the desired changes is greater than the extra time spent each day; so they go on day after day and year after year carrying grain in a bushel basket from the granary above, across the barn floor, down a flight of stairs to one end of the stable to feed the cows at the other.

This is quite common on many dairy farms. On one farm, after measuring the distance traveled and computing this for only one year, it was found that this dairyman in feeding forty cows, grain alone, walked the equivalent of from New York City to Chicago and back again, and the distance going up and down the stairs was equal to walking to the top of the Woolworth Building in New York City and back again seven times. A bushel basket may be all right to use in feeding five or six cows, but not for feeding forty. This man has made a chute to the basement in the feeding alley and now feeds the cows in one quarter of the time. A conveniently arranged feed storage is quite necessary on a dairy farm. This should be on the floor above the stable with sufficient space for mixing, with a chute leading to the feeding alley below.

The sanitary conditions of a stable and the methods employed in milk production has much to do with the bacteria count of the milk. The floor should be watertight and free from sharp angles in the gutters and mangers. The concrete floor should be laid to drain and the stable should receive unobstructed light through clean and large windows. The absence of large columns,

bulky partitions and box stalls assist in the diffusion of light and fresh air.

Sunlight is the giver and guardian of life. The rays of sunlight contain ultra-violet rays which, according to Dr. Harry Steenbock, of the University of Wisconsin, make active vitamin D. Vitamin D makes it possible for animal life to assimilate lime from food. Healthy bodies need lime just as skyscrapers need steel. Direct sunlight through large open windows is much more beneficial than the sunlight filtered through glass often covered with thick dirt and dust. It is hard to improve upon a paved barn yard where the cattle can exercise and receive plenty of direct sunlight.

The location of the milk house is important. Every four and one-half feet that the milk house is placed from the stable means one mile travel per cow per year. A distance of 81 feet makes 18 miles of travel per cow per year, if the milk is strained in the milk house. Many of the silos are built with little thought as to the convenience in filling or feeding. I have seen silos being filled when, after the wagon is unloaded, the rig must be backed away from the ensilage cutter before another team can drive up. Almost as much time is used to get away from the machine as it takes to unload. This same silo was at one end of an 80-foot barn with the cows across the other end. All the silage was carried in a potato crate to each cow the length of the barn. This man is now using a feed cart which saves a great many trips. A silo should be located near the feeding alley with a feed cart so constructed that it can be pushed under the silo chute so that when the ensilage is thrown out it will load the cart. Where no feed cart is used, the most convenient place for a silo is on the side of the stable in the middle of a row of cows, but where one uses a cart there is little preference as to the location as long as it is next to the feeding alley.

Before building a new barn or rearranging an old one, a person should make floor plans and trace the lines of travel which will be covered in doing chores. Mistakes in the purchase of a cow can easily be rectified or a mistake in planting a particular crop affects the farm for that year only, but when a mistake is made in building arrangement it is very serious because it lasts a long time and is not easily changed.

A barn 36 feet wide is most commonly preferred by dairymen although 34 feet is fairly satisfactory, but most of the new barns now being built are 36 feet wide. This width seems to be best suited to all kinds of stock and such a barn can easily be converted into a sheep barn, feeding barn or hen house.

There is much discussion among barn designers and professional men as to the question of whether cows should be faced in or out. The farmers discuss this question very little, but the result of the studies shows that 90 per cent of the farmers visited prefer to have the cows face out with a driveway between the rows enabling them to clean the stables with one handling of the manure. In a time study made in New York State on about one hundred farms with herds of equal size, it was found that it required 35 minutes per day to care for each cow when they face in. When they face out it required 30 minutes or a saving of five minutes a day for each cow in the herd.

If possible, when building a new barn or rearranging an old one, have the stock all housed in one barn with the cows in one end and the horses in the other. There is a big saving both in building costs and in labor in caring for the stock. It was found that where the horses are in the same barn with the cows, the distance traveled per horse per day was reduced 200 feet and the time saved was 8 minutes per horse. This time is worth as much as the total charge to horses for the use of the building.

The summary of the advice that I would give to the average dairyman on barn planning would be: Face the cows out with a driveway between them the full length of the barn. Locate the milk house at one end or side of the stable as near the cows as possible. Locate the silo at the side of the feeding alley and use a feed cart. Place the hay chutes at the side of the barn and between each two mows. Have them large enough so that when filled, there is sufficient hay for one day. Construct a ladder in the chute. Locate the granary above the stable with a spout to the basement in the feeding alley. Place the stairway, the forks and shovels near that center of operation where a farmer most often finds himself when he stops to think and plan his work.

It is easier to control diseases of livestock where the barn has solid concrete floors, free from dirt hidden in deep cracks and dark crevices. Disinfection can be much more thoroughly done on such a floor than on the old type water soaked floor with all its disadvantages of bad odors, unevenness, etc.

To illustrate the effect of the floor on the control of disease a quotation from "Veterinary Hygiene" follows:

"A stable floor which will meet all requirements must possess certain qualities among which the following should be mentioned here. The stable floor must be impervious. A pervious floor would absorb urine and fecal constituents which would then decay and result in the formation of carbonic acid, ammonia and various foul smelling harmful gasses which pollute the air of the stable.

The animals' excrement, which is rich in organic substances also acts as a favorable nutrient medium for various disease organisms. The disease germs that have penetrated into the pervious floor can remain viable and virulent for months and sometimes even multiply as tuberculosis, infectious abortion and organisms causing inflammation of the udder."

It is of just as much importance to carefully plan to remodel a barn as it is to decide upon the proper design for a new house. I have attempted to justify the statement that it pays to carefully plan a dairy barn, new or remodeled, and I hope I have at least partially succeeded.

Inter-State Milk Producers' Association

ORGANIZED 1917

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Inter-State Milk Producers' Association

H. D. ALLEBACH, *President*
R. W. BALDERSTON, *Secretary*

Flint Building, 219 N. Broad Street
Philadelphia

More and Better Legume Hay For Pennsylvania

By W. H. HOSTERMAN,

Hay, Feed and Seed Division, U. S. Bureau of Agricultural Economics

Pennsylvania is one of the important dairy states, ranking eighth in the number of dairy cows. The average number of dairy cows and heifers, 2 years old and over, in the State, was 870,000 during the period 1924 to 1928.

During the past season 2,939,000 acres of hay were harvested in Pennsylvania, of which acreage approximately 50% was timothy and clover mixed, 34% was timothy, while but 13% was legumes. By comparison with other important dairy states such as Wisconsin, Minnesota, Ohio and New York, the State of Pennsylvania has a lower ratio of legume hay acreage to the number of dairy cows. In Wisconsin, for example, during the period 1924 to 1928 there was an average of 55 acres of legume hay to 100 dairy cows; in Minnesota, 60 acres; in Ohio, 75 acres; in New York, 50 acres; while in Pennsylvania there were but 43 acres.

The legume acreage in Pennsylvania in 1928 consisted of 288,000 acres of red and alsike clover, 85,000 acres of alfalfa and 9,000 acres of annual legumes such as soy beans. It is interesting to note that the average acre yield of alfalfa hay in Pennsylvania for the last five years was 2.44 tons, for clover 1.54 tons, and for timothy 1.44 tons. These figures show that alfalfa materially outyields both clover and timothy, and that clover outyields timothy.

The cost of a well balanced ration for dairy cows is usually lowered materially by the use of good quality legume hays. Both alfalfa and clover are more nutritious than grass hays such as timothy, because they contain larger amounts of digestible protein and lime. Alfalfa has approximately 230 lbs. of protein and 39 lbs. of lime per ton; clover 178 lbs. of protein and 32 lbs. of lime; while timothy has only 66 lbs. of protein and 5 lbs. of lime. The dairyman who has home grown legume hay available can reduce the amount of relatively high priced concentrates in the ration. In September, 1928 the cost per 100 lbs. of digestible protein figured on the basis of the price farmers received for hay in Pennsylvania and the price they paid for linseed meal and bran, was as follows: alfalfa hay, $6.48; clover hay, $6.74; timothy hay, $18.17; linseed meal, $9.94; and bran $15.75.

Experimental work in feeding rations to dairy cows, consisting of grain and various hays has proven the material superiority of legume hays over timothy in milk production. A quotation from a nutrition expert is here given on this subject: "In these experiments cows were fed first on grain and alfalfa and then on grain and timothy or vice versa. Lime was added to the ration including timothy so that the cows got nearly equal amounts of protein and lime in both rations. At all times the cows were given as much feed as they would eat, and they consumed decidedly more protein and total digestible nutrients than they required according to any recommended feeding standards. The cows produced 35 to 40 per cent more milk and fat when fed the rations containing alfalfa than when fed the rations containing timothy."

While it is not considered advisable to substitute legume hays entirely for concentrates in the rations, they should be used to a far greater extent than at present in most dairy communities to reduce the cost of the ration. There are many sections in Pennsylvania where large acreages of timothy are harvested and stored as the principal roughage for high producing dairy cows. In these areas timothy is often allowed to stand until the seeds are ripe and the plants have turned brown, at which time it has very little feed value because the plant food has been stored in the seeds and the stems have become straw-like and woody. Overripe timothy of this character has little value except as a "filler."

Much of the land in Pennsylvania on which timothy is now grown may not be suitable in its present condition for the production of alfalfa or clover. Many of these soil areas, in the largest limestone producing state in the Union, however, can be made suitable for the growth of alfalfa or clover by an investment in lime and phosphates, for the correction of soil deficiencies, that will bring profitable returns from these legume crops. With soils made suitable for these crops, with seed from hardy varieties and with proper attention paid to soil inoculation, there are extensive soil areas in Pennsylvania that will yield profitable crops of either clover or alfalfa to lower the costs and improve the quality of the rations for dairy cows. Where conditions are favorable alfalfa will give better results than clover because of its higher yield per acre, its higher nutritive value, and because the stands do not have to be renewed as often.

In recent years nutrition experts and feeders have come to a realization of the fact that wide variations exist in the feed value of all kinds of hay, according to the time of cutting, methods of handling, character and extent of weather or storage damage,

and the purity of the hay. The degree of leafiness is a very important factor in the feed value of either alfalfa or clover hay. In alfalfa hay, for example, 2/3 to 3/4 of the protein in the plant is carried in the leaves, while approximately 9/11 of the crude fiber is in the stems. The amount of natural green color is another character of importance in the feed value of hay, because good color indicates proper curing, aroma, palatability and freedom from damage. On the other hand, dark brown colors indicate relatively low feed value caused by rain damage, excessive fermentation or over-ripeness. Purity is of importance also as an index to feed value because if hay contains quantities of weeds or weathered rakings, the total nutrients are materially reduced.

Farm management methods essential to the production of high quality legume hays, are (1) establishing and maintaining a pure stand, (2) keeping meadows free from weeds and trash, (3) cutting the hay at the proper stage of maturity, (4) preventing excessive weather damage, (5) curing to preserve leafiness and color, and (6) storing to prevent weathering or the development of unsoundness.

A vigorous, pure stand is essential for the production of high quality hay of any kind but especially of clover and alfalfa. Pure, thick stands of alfalfa and clover have the fine stems and high degree of leafiness essential to the type of hay preferred for dairy cattle feeding. Clover usually follows a grain crop and unless the stand is thick enough to smother the weeds the hay is very liable to be trashy. Alfalfa meadows should be broken up whenever the stand begins to thin out. Grasses and weeds spread into alfalfa meadows with thin stands and reduce the feeding value of the hay harvested.

Hay meadows should be kept clean from weeds and trash because such material in hay detracts from its appearance and lowers its feed value. Meadows should be raked in the spring of each year to remove old stubble and spoiled hay left from the previous year's operation. After each cutting the meadow should be raked also to clean up the scatterings of hay.

The maturity at time of cutting is a very important factor in the production of high quality hay. Clover should be cut not later than full bloom. Alfalfa should be cut when it is about one-fourth in bloom or when growth has started from the crown. Little if any increase in tonnage is gained by allowing either crop to stand longer. When clover is allowed to mature until all the blossoms have turned brown, the stems and leaves also turn brown, many leaves are shed, and the palatability and feed value of the hay are diminished. When alfalfa is allowed to mature to the

full bloom stage, many of the leaves are lost before it is cut and many more are lost during the curing process because the leaves drop more readily from late cut hay than from early cut hay. Crude fiber is relatively high and protein relatively low in overripe and stemmy alfalfa and clover. From the standpoint of the value of hay for dairy feeding purposes it is very essential that both clover and alfalfa should be cut before the plants start to mature and shed their leaves.

Weather damage caused by rain while the hay is in the swath, windrow or cock cannot always be prevented even by the most skillful farm managers. There is no escape from the unexpected rain that falls on hay prior to its being stored away. A close observance of Weather Bureau reports is of value to hay producers in planning their haying operations and in decreasing the chances from damage. Loss of quality from rains, heavy dews and fogs during the curing process is minimized also when the hay is cut at the proper stage of maturity and thereafter handled with modern machinery and by the most rapid and approved methods.

Hay making methods for legume hays should give first consideration always to the preservation of maximum amounts of leafiness and color. Methods for the rapid evaporation of moisture must be considered also but such methods should not sacrifice leaves and color in order to save time in curing. The preservation of leaves in legume hays demands that all handling be done when the hay is in a tough or slightly tough condition in order to avoid overdrying in the swath or windrow. The most practical method to prevent leaf shattering during the curing process is to allow the evaporation of a part of the moisture to occur while the new mown hay is in the swath, and then to rake it into windrows while it is still in a tough condition and before the leaves are easily shattered. The curing should then be completed in side delivery rake windrows or in cocks. No definite length of time for swath curing can be assigned as it will vary with the tonnage of hay per acre, temperature, sunshine, wind and humidity. The rule should be rather in terms of the condition of the hay in the swath, namely: well wilted before raking. The side delivery rake is well adapted for raking wilted hay. Windrows made with this rake permit the hay to aerate and cure without additional handling unless it is rained upon, in which event the windrows may be neatly and easily turned with this kind of rake. Less shattering of leaves and less loss of green color from bleaching will take place in such windrows than if the hay is cured in the swath or in the wide, flat windrows made with

the dump rake. The side delivery rake also facilitates the gathering of the hay with the loader.

In a humid climate such as that of Pennsylvania, the ideal storage place for hay is in barns or sheds. When hay, especially legume hay, is stored in stacks a layer of straw spread over the top of the stack will aid in shedding the rain and snow and will reduce the amount of spoiled hay.

U. S. Standards reflect the approximate feed value of various kinds of hay because the quality factors previously discussed have been used as the basis for the grade specifications. The quality or grade of hay when expressed in terms of leafiness, color and foreign material is an approximate measure of feed value. U. S. hay standards employ numerous descriptive terms and notations that add to the information contained in the numerical grade. The following are some illustrations: U. S. No. 1 Extra Leafy Alfalfa described alfalfa hay that has an extra amount of leaves over the requirements for ordinary U. S. No. 1 Alfalfa. U. S. No. 2 Coarse Clover describes clover in which the stems are large in diameter as well as stemmy. U. S. Sample Grade alfalfa (moldy) describes alfalfa that is unsound because of mold.

Dairymen who have to purchase all or a portion of their hay supplies in the form of baled clover or alfalfa will find the U. S. hay standards and Federal Hay Inspection Service of real benefit in obtaining carlot deliveries of the class and grade of hay wanted. An order based on an official U. S. grade with the further specification that the shipper shall furnish a Federal certificate of complete inspection assures the purchaser of a delivery of the quality wanted with the inspection made by a licensed inspector who is not interested in the business transaction. Full information about U. S. hay grades and Federal inspection may be had by application to the Bureau of Agricultural Economics, U. S. Department of Agriculture, Washington, D. C.

In an important dairy state such as Pennsylvania the acreage of alfalfa and clover should be increased because home grown legume hays provide a cheaper source of protein than mill feeds and concentrates. Cutting legume hays at the proper stage of maturity and curing and handling them so as to prevent loss of feed value are factors that Pennsylvania dairymen should give consideration to in order to obtain the best results from home grown legume forage.

The Importance of Quality in Dairy Products

R. R. GOCKLEY

Manager City Plants and Sales
Dairymen's League Co-operative Association, Inc.

Quality in any product is that which makes it distinctive. What is it that continues Ivory soap as such a successful seller after many years? There are any number of unsatisfactory products that are sold by sales pressure when first offered to the public, but we all know that very few, if any, of us come back for a second dose. Producers of big sellers are willing to expend tremendous amounts of money on advertising and sales effort in order to introduce a product on the market when they feel the quality of that product is right, knowing that the public will re-order once they have tried the product. We can recall the name of at least one automobile that several years ago was a big seller, but because the quality did not continue to be what it should have been, that make of automobile has been discontinued.

An Alexander Hamilton text on marketing and merchandising cautions that you make sure of the product. Tests should be made to prove that the product is right and that it does the things the manufacturer wants it to do. It goes on to say that rushing into a market with an untried product is dangerous and often expensive. Unless the product is right, even the most carefully planned sales methods will fail. Tests should be made to show that the product will stand up under usage or otherwise accomplish its purpose. The manufacturer of a well-known food product experimented for years to get it exactly right.

The trains that convey the commuters to their work and back carry car-card ads. A large percentage of the ads describe products well known to all who read them. They range from clothing, foot wear, soaps, right on through foods, and practically every one of the ads mentions quality as the outstanding feature. And it is true that those best known are of high quality and have been since they were first put on the market.

Barron Collier, one of the leading advertising counsellors of the country in one of his advices says in substance that advertising will never replace quality and that advertising a poor quality product is wasting money.

Professor Boyle, of Cornell University, in the January number of *Nation's Business* in an article on "Cooperatives and Common Sense" and speaking about fruit associations, says "The first major advantage of cooperation is the grading and standardizing of the product. This is a fundamental service, and must begin with the farmer. This service benefits both the producer and consumers, and makes possible a better, wider and cheaper distribution".

It, therefore, apparently is true that those products that are of high quality have lasted through the years, but that those products of poor quality have not lasted. All of us have noted the excellent advertising that appears regularly in popular fiction and part fiction magazines, always the first advertisement after the reading matter and usually done with a lot of red in it—Campbell's Soup Ads. Do you think this company would have made the tremendous progress it has, even with their continuous advertising and constant sales effort, if the soups were not of the highest quality?

If it is true that every conceivable type of product requires the highest possible quality, how much more important it must be for dairy products to have a high quality since milk is recognized as the most perfect food, and one of the easiest to spoil. This is a meeting of a Dairymen's Association. Many of you produce milk on your farms, others undoubtedly manufacture milk into dairy products and by-products. Some of you may operate sales organizations which sell milk and dairy products. A number of you may enforce health or food regulations. Every one is interested in a successful operation which eventually should mean a better financial return to the farmer producing the milk.

Products of the milk plant are usually sold in the form of milk, cream, butter, buttermilk, cheese, powdered milk, ice cream, etc. Is there a single product mentioned in this list that need not be of high quality? Buttermilk usually is sold in the form of cultured buttermilk and is a by-product made from skim milk. If it is always of a uniformly high quality it is one of the best sellers in any community but let the buttermilk maker have his starter off flavor for several days and see what happens to your sales!

Someone writing on increasing sales in *The Milk Dealer* sometime ago said "Specific stuff commands a premium in advertising to get quality and purity across. General statements have been overworked by practically all advertisers. An advertiser can trot out a general statement claiming splendid quality.

Only the dairy with the goods can talk of specific things constituting proof. All this dictates that quality advertisers able to give the specific facts, do so."

Authorities are agreed that dairy products should constitute a generous and regular portion of the meal. We are all familiar with the work done by scientists showing the effects on the health and growth of small animals on diets with milk and without milk. According to Dr. E. V. McCollum of Johns Hopkins University, the American family should spend thirty percent of its food budget for its dairy products. They now spend only twenty percent. We will never increase the expenditure ten percent unless the American people all over this country are able to buy dairy products about which there can be no complaints.

Within the last five years a number of the large milk concerns have been constructing milk plants in the South. Much of the milk and cream used in the southern cities came from the Middle West. Dairying in the South is rapidly on the increase; so much so that a considerable number of milk condenseries are being constructed there. Several of the large cheese companies are putting cheese plants there. The South, therefore, is rapidly taking to dairying. A Southerner in one of the milk magazines said in substance—The greatest hope for the future of Southern dairying is education. This is meant in more ways than one. Southern people, of old American stock, naturally are of the type that consume dairy products more readily, under normal conditions, than do other people. Their per capita consumption of milk is low, not necessarily, because they don't like milk, but because they want good milk.

The Los Angeles County Times some time ago came out with the heading—Los Angeles Milk of High Quality—and then goes on to say—"A surprise milk scoring contest conducted during the last week by the State Department of Agriculture gave the City of Los Angeles one of the highest scores obtained thus far this year in the State. Producers in many instances are supplying milk above the average standard." Think of the excellent effect this had on the people of Los Angeles and the chances which were opened for efforts towards increased milk consumption. Compare the effect of this examination with the one nearer at home where official examinations were made of a city milk supply and in which the milk from only one milk company was satisfactory. In this case the results also were published in the city papers but the reading was not at all like that in the Los Angeles paper. The sales of the dealers not satisfactory the next day, were, just what you would expect under

the circumstances. Those dealers had not estimated the importance of quality in dairy products.

Out in St. Louis a new milk plant was opened. It is equipped with the latest type machinery to handle milk and milk products in the most sanitary and economic manner possible. They advertise the milk—Highland—The Better Milk. They conduct visitors through the plant, have an auditorium which is for the free use of Women's Clubs, etc., they carry on general advertising in leaflets, bottle cap openers, etc., but the management insists that their best advertisements are their products.

Not too long ago quality in cream was not considered very seriously. This was particularly true in the Middle West where cream was centralized periodically and then shipped or else churned into butter. In one of the late issues of the New York Produce Review—The subject—The Question of Cream Quality—is discussed by the Vice-President of Armour and Company speaking about centralized cream—"For more than thirty years I have been in the category of the creameryman who has hoped that we would reach a more ideal condition on the quality of our creamery butter. During this period of years I have seen millions of dollars expended in the development and installation of creamery machinery for improving the quality of butter. The creamery industry is outstanding in its scientific research in finding ways and means for improving the quality of cream after it is received in the factories; however, we have been slackers in our efforts to correct cream quality troubles before the cream is received at the creamery. Much has been accomplished in developing the quality of cream purchased through our cream stations the past few years, however, we are at a point in the industry when we must expect some improvement in cream quality at the source. As we analyze this situation this improvement in cream quality must come through the cooperation of two sources; first—the producer, second—the cream buyer."

There is a co-operative organization in Minnesota—Land O'Lakes—which does not now put its name on butter unless that butter scores 93 or better. They worked on the improvement of the quality of the cream that went into the butter. They also put into effect a uniform system of butter manufacture so that if they did receive a good grade of cream they were sure to produce a butter scoring 93 or better. In 1927 seventy two percent of all their butter had this high score. Land O'Lakes butter is becoming a household word all over this country because everyone knows whenever you find butter with that name on it, they are assured of uniformly good butter. The Land

O'Lakes results are an excellent example of the importance of quality in dairy products.

Each year it seems as though the public were becoming more critical of what they eat. Because of these higher demands agencies are set up which will assure any one of the quality of the food purchased. For instance, the United States Department of Agriculture maintains official inspectors in certain locations in the country who inspect such foods as butter, cheese, fruits, grains, etc. In New York City large quantities of butter are sold on the basis of the official score. High class hotels, restaurants, steam ship lines, etc., buy only on score. Because they cater to the best trade, they insist that they be protected as to the quality of butter they get. That means that only butter of high quality can be used and therefore, commands the best price, again indicating the importance of quality.

Pick up a late issue of the New York Produce Review and at this time of the year you will find cheese quotations at New York for either fresh fancy cheese or held fancy cheese. In other words you know what the market quotation is for high quality cheese. Offer cheese for sale which is not high quality enough to qualify for fancy cheese and see what happens to the price you expect to receive for it. The grade of cheese just below fancy is termed average run. Average run cheese for the last few years on the New York market has averaged a cent and a quarter per pound under fancy cheese. Think of it, a cent and a quarter less for every pound of cheese simply because the importance of quality in cheese was not taken seriously enough.

In the last three years there has been a large increase in the pounds of powdered milk manufactured in this country. This naturally means a highly competitive condition in the market. Only those manufacturers whose quality of powder is such that the consumer can rely on from week to week can expect to continue to dispose of it profitably. There is much roller process powder being used by farmers as animal feed. Off hand one might think that since the powder is used for animal feed, price would determine the choice. Transactions of last year indicate that as a matter of fact the majority of the farmers preferred the highest quality powder at a higher price. Their results indicated that in the end the good powder, even though it cost more per pound, was the least expensive.

Very little need be said about ice cream. The dealer who sells a poor grade of ice cream might as well put a sign over his door announcing that fact for the only trade he will have are the

people in that section for the first time. The second time they will try some other dealer.

We have discussed a number of dairy products under different conditions. In the last analysis, where must quality begin? Unless the milk on the farm is right the resultant product cannot be right. Boards of Health recognize this and so they place, in the case of some cities, many and severe restrictions around the production of the milk. Milk, we repeat, is considered a perfect food; unfortunately, the contents that make it a good food for human consumption also make it a desirable medium for the growth of organisms which quickly break down the quality of milk.

Large milk organizations all over this country spend fortunes in trying to regulate the quality of the milk as it is taken from the cow. They do not do this to pass Board of Health requirements; they do it because past results have clearly indicated that good quality of milk at the farm to them means economic success. Mention is not made as to the way they handle the milk after they get it from the farm. If their methods of handling and disposition were not right, they never would have grown to be big milk concerns. Milk that has to be refused at a plant receiving platform is a loss to everybody.

It seems to be a general fact that those farmers who consider seriously the importance of quality in the milk that they deliver, consider seriously their obligations to the community, and conversely, those farmers who habitually deliver a poor quality milk generally are the hardest to get to enter a high quality proposition in the community.

The National Dairy Council and other similar organizations are spending much effort and money for advertising. They are particularly working with school children to get them to drink more milk and to carry that message home. Children like milk that is wholesome, that tastes good. If they form the habit in school of drinking milk regularly, they will probably carry the habit through life and we will have a nation of healthy milk drinkers. If we consider seriously the importance of quality of milk we will give those children a milk that they like thereby creating a greater demand for milk, but of more importance, grow a healthy generation.

Less Expense—More Feed—More Profit

WILBER J. FRASER
Professor of Dairy Farming, University of Illinois

In debating whether or not sweet clover pasture will prove valuable to him, the dairyman should not lose sight of the fact that the kind and amount of feed which good cows get, largely determines their production, and also that feed is about 60 percent of the cost of production. One of the high points to be remembered in dairying is that the top of the ration makes the milk and the top of the milk makes the profit. Thus a crop which will solve the feeding problem for six months is surely worthy of first consideration in planning for the feed production of future years.

The cow's requirement for feed is continuous throughout the summer, and the greatest need is for an abundant pasture in the trying time of flies and excessive heat, which is just the time when the ordinary bluegrass pastures so miserably fail to supply sufficient feed. In order to solve the pasture problem economically, we must have an ample and continuous supply of feed for the six months of summer, and eighty-one answers from questionnaires on the pasturing problem made it clear and positive that sweet clover stayed green and fresh throughout the hot dry weather of July and August when bluegrass pastures were burned up.

All of the farmers answering the questionnaire were highly pleased with the production of their cows and several reported better production on sweet clover pasture without grain than on such an excellent winter ration as corn silage, legume hay, and a good grain ration.

Need Much Supplementary Feed with Bluegrass.—According to a four years' test of bluegrass here at the University of Illinois, it was found that, allowing one and a half acres of bluegrass per cow, a good cow would require to properly and adequately supplement pasture, an average of 30 pounds of silage, eight pounds of hay, and ten pounds of grain per day for five out of the six summer months. It would require one and a half acres of land per cow to produce this supplementary feed. Thus for a herd of twenty cows, it would take, besides the 30 acres of bluegrass pasture, 30 acres of other crops and all the labor of raising them; threshing the oats, making the hay, filling the silo, husking the corn, and grinding the grain, besides the labor involved in feeding in the barn the year round. In other words,

one acre of cultivated crops would be required for every acre of bluegrass pasture, and much labor in addition. This is expensive summer feeding, makes the profits lean indeed, but the loss is much worse with the many herds that are not given this extra feed, because they go hungry, lose flesh, and fall off in their milk flow, thus cutting off all chance of profit.

Because sweet clover gave promise of being such a reliable pasture, I began raising it on my farm in northern Illinois twelve years ago. The results were so excellent that I have spent considerable time during the last few years studying this crop wherever possible. One cow on my farm produced 56 pounds of milk per day on sweet clover pasture without grain, and I have seen several other cows in different parts of the state that produced this amount or more on sweet clover pasture without grain. One of these cows, belonging to Mr. Renschen of Clinton County, produced 75 pounds of milk on three milkings per day without grain. Here is strong evidence of the high feeding value of sweet clover for dairy cows.

Saves Land, Labor, and the Cow's Energy.—In addition to the fact that sweet clover pasture saves land and labor on the dairy farm and provides for such a good production of milk, it aids the cow in producing this milk by conserving her energy in that it permits her to fill up on this abundant feed quickly and then lie down and contentedly chew her cud, instead of having to eat all day, as she does on bluegrass during dry weather, in a vain attempt to get sufficient feed.

Can Be Disked Into Bluegrass.—There is much untillable land in the Middle West which is kept in grass pasture. Sweet clover seed worked into this bluegrass increases the yield of pasture two or three times, provided the land is not acid, and as a good stand is secured. Maes Brothers, Jackson County, Illinois, have had remarkable success with this practice. At the time I visited their farm, one pasture was still producing a good amount of sweet clover after having reseeded itself for seven years.

Not Difficult to Grow with Proper Methods.—Troubles have been found and failures have occurred in growing sweet clover, and for this reason, many imagine that sweet clover is a difficult and uncertain crop to produce.

Sweet clover does have two requirements that are absolutely essential to its growth; namely, soil that is not acid, and inoculation. Complying with these requirements makes the difference between success and failure in raising the crop. Experienced

growers, almost without exception, report no trouble in securing a stand after the soil has been limed and inoculated where needed. This is a new crop and it is not strange that many growers should at first overlook or ignore this preparation.

Sweet clover often grows along the fence row or roadsides, and people make the mistake of concluding from this that their soil is not acid. The fence row has not been cultivated and hence has not lost its lime, while the tilled field adjacent has been worked for many years and is quite likely to be deficient in lime. The ground limestone should be applied and mixed into the soil three or four inches deep, at least six months before seeding. From two to four tons per acre is the usual requirement.

Lime Will Last a Dozen Years.—It has been found by many actual tests, as well as by the luxuriant growth of the sweet clover, that one application of ground limestone will keep the soil sweet for ten to fifteen years. Sweet clover seeded on acid soil will frequently make a start and cause the farmer to think he is going to get a stand, but later in the season it turns yellow and dies.

Inoculation may be accomplished by buying the pure culture and following the directions that come with it. Another method is to get some soil from a field where sweet clover has grown successfully and mix a quart of this soil with a quart of water, shake thoroughly, and let stand a few minutes. Then pour off a pint of the top muddy water and apply this to a bushel of seed and mix well.

"Biennial White" Best Variety.—Biennial White sweet clover is the kind recommended for dairy pastures. It will frequently grow successfully where alfalfa and other clovers will not grow at all. It is a sure "catch" when sown on sweet and inoculated soil. With ten consecutive years' seeding here at the University, a stand was obtained every year, while in the same ten years only five stands of red clover were secured. This variety of sweet clover develops such large, deep roots that it withstands the drouth, withstands heaving in the spring if allowed a fair growth the summer before, makes the most pasture, and is most beneficial to the crops that follow. Care should be taken in buying seed to get this variety rather than some smaller strain or the annual Hubam.

Best to Seed in Spring in Small Grains.—The most successful management of sweet clover pasture requires seeding each year in the small grain. The cattle begin in the spring on the second year's crop which comes on early. They graze on this

until the middle or last of August, when they are turned on the new clover in the grain stubble until the latter part of October. The old clover and the new seeding are growing on the farm each year, and the six months' pasture is partly from the one and partly from the other. The pasture requires but one year's use of the land, however, because a crop of small grain is cut from the same land on which the clover grows the first year. The expense of the ground is chargeable to the clover for only one year—the second year of its growth.

Thus the most important points to be remembered under the successful culture and management of sweet clover for pasture may be summarized as follows:

1. If the soil is acid—apply lime. This is very important as it is a waste of seed and time to attempt to grow it on acid soil.

2. If the land is not already inoculated, the seed must be.

3. Either for pasture or to plow under to improve the soil, the Biennial White variety will give the best results and should be seeded in small grain in the spring.

4. The crop should be permitted to make a good growth the first fall. It should reach a height of 12 to 15 inches before turning the stock on, so the plants can develop root system.

Common Objections Not Serious.—The three objections often mentioned in connection with sweet clover are that the cows will not eat it readily; that it sometimes causes bloat; and that it occasionally taints the milk. I spent one entire summer visiting dairymen who had their cows on sweet clover pasture and yet I have never seen anyone who put his cows on the sweet clover when it was young and tender who experienced any difficulty, after the first day or two, in getting his cows to eat it.

Tainted milk can be avoided by having a little dry roughage available to the cows to keep their bowels in good condition. This is especially important when cows are first turned onto sweet clover pasture. Many dairymen in Illinois are pasturing their cows on sweet clover and are shipping milk to cities and have no objections whatever because of a sweet clover flavor in the milk.

When sweet clover has not been frosted, I have never heard of a serious case of bloat if the cows are kept continuously on it, night and day, and are given access to a little dry straw in the pasture.

Thus the three common objections to sweet clover as a pasture come to naught when put to the test in intelligent farm

practice, while its advantages, in that it saves land, labor, and the cow's energy, and thus produces more milk and profit per cow and per acre, make it a most valuable crop to the dairy farmer.

Improving the Dairy Herd by Breeding

By M. H. Fohrman
U. S. Dairy Bureau, Washington, D. C.

The gratifying results which have followed the application of science to modern business should create a desire on the part of all dairymen and breeders of dairy cattle to know what discoveries of science may be of assistance to them in increasing the producing ability of their cattle. Although genetics is one of the infants of the family of science, scores of workers are now diligently applying themselves to the discovery of the secrets of heredity. The up-to-date breeder should be interested in what is being done and what has already been found out about the workings of the laws of heredity. While this necessitates the study of a subject which may seem complicated to the laymen, yet the man who has mastered the intricacies of the modern machinery and equipment in daily use need not hesitate to undertake to familiarize himself with some of the underlying principles of heredity.

All living things are cellular in structure and range from the unicellular plants and animals up to the most complex organisms which are aggregates of great numbers of cells. Cells in general have certain characteristics in common, but the more complex the organism becomes, the more highly specialized are the different groups of cells. The various parts of the body are composed of these different masses of cells.

The small rod-like bodies within the nucleus of the cell are named chromosomes, and they are the carriers of the genes, or determiners of the hereditary characteristics. Chromosomes normally are found in pairs, but the reproductive cells contain only half the normal number.

A new individual begins when a male reproductive cell, or spermatazoon, unites with a female reproductive cell, or ovum. Each of these brings half the chromosomes with which the new individual begins its career, and so each parent contributes equally to the hereditary makeup of the offspring. What that individual becomes depends upon its heritage, but an unfavorable environment can hinder the full development of its inherent potentialities.

Mendel discovered experimentally that characteristics are transmitted from parent to offspring in a definite manner. He worked with plants and studied the inheritance of so-called unit characters, controlled by a single determiner. He found that in contrasted characteristics, as demonstrated by the tall and dwarf varieties, the characteristic tallness was dominant, and matings of

pure tall and pure dwarf plants gave a hybrid generation all tall, but that both tall and dwarf plants could be segregated by interbreeding this hybrid tall stock. This convinced him that the determiners for dwarfs were not affected by mating with tall plants, but still functioned normally when determiners for tallness were absent. Numerous other contrasted pairs were similarly studied.

In dairy cattle the polled or hornless condition is dominant over the horned condition. Black and white in Holsteins is dominant over red and white, and yet in many cases the recessive red has appeared in crosses of black and white parents.

Milk and butterfat production is governed by the same laws of heredity, but here the problem is far more complex, as a number of determiners are involved instead of a single pair.

Evidence available indicates that at present the hereditary makeup of nearly all dairy cattle for milk and butterfat is mixed, or heterozygous. That is, most animals carry some factors for high and some for low production. In cattle matings there is a division and reassembling of these factors, and results of such matings are always uncertain.

In studying a large group of cows of one breed it was found that the yearly increase in production in a single generation was only 164 pounds of milk. It takes 2½ to 3 years to develop a generation, and that rate of progress is disappointingly slow. Without careful selection of bulls the tendency was decidedly toward the average for the group; that is, the offspring of most of the better cows tended to be poorer than their dams, and daughters from low producing dams were generally better. When the dams were divided into Group A, all above average, and Group B, all below average, the better group averaged about 4000 pounds of milk per year more than the poorer group, but the daughters of Group A yielded on the average only 1,000 pounds more milk per year than the daughters of Group B. Three-fourths of the difference due to female selection was lost in a single generation where no particular attention was paid to the selection of the males. However, when the offspring of the ten best bulls were considered, it was found that these bulls could maintain the high level of production in their daughters from Group A dams and also bring about a much greater increase in daughters from Group B dams.

This points the way for the wise breeder to proceed in improving his dairy herd by breeding. Only those sires should be used that have demonstrated through their daughters that they are transmitting the factors for high production. The records of the daughters give a far more certain analysis of the transmitting ability of the sire than anything which can be found in his pedigree or conformation.

The selection of a good bull is the key to the situation because his transmitting ability can be discovered while he is still young enough to be of service. It is almost impossible, on the other hand, to obtain records of a sufficient number of daughters to prove the transmitting ability of the cow while she is still alive. The record of the cow is not a true index of what she will transmit, especially in the present mixed makeup of our dairy cattle, as is shown by the fact that many high producing cows have lower record daughters and many good producers come from mediocre dams.

Therefore, the best procedure to follow in improving the dairy herd by breeding is the continuous use of bulls that have proved through their offspring the ability to transmit increased production. The next best method is to use a son of a proved sire from a good daughter of another proved sire. In pedigree selection the males should be taken in consideration as much or more than the females.

NOTE: This is only a summary of the complete address.

Annual Banquet

The Pennsylvania Dairymen's Association, Harrisburg, Pa., January 23rd, 1929

Toastmaster, E. B. FITTS

ADDRESSES

E. S. BYARD, Editor, *The Pennsylvania Farmer*

HON. C. G. JORDAN, Secretary of Agriculture

Announcing Awards in Cow Testing Association Work in 1928

C. R. GEARHART, Penna. State College

Announcement of Milk Awards—GEORGE R. TAYLOR

"What a Federal Farm Board Can Do"—

DR. CLYLE L. KING,

Wharton School of Finance and Economy, University of Pennsylvania

What a Federal Farm Board Can Do

A Basis For a National Agricultural Policy

By CLYDE L. KING, PH.D.

Wharton School of Finance and Economy, University of Pennsylvania

Proposals for American farm relief fall into four separate classes:

1. Money and credit.
2. A price on exports above the world market.
3. Tariff.
4. A strong marketing policy administered through a Federal Farm Board with ample powers and adequate money.

Let us examine the fundamentals of each of these in turn.

MONEY AND CREDIT

For many a decade our farmers felt the heavy hand of a high interest rate on a remorseless mortgage. These mortgages were usually of the term variety, the full amount due at a given date. Such terms were not suited to the slow annual returns of the farm. No big fees nor exceptional sales came along as windfalls and growing families sopped up the annual increments.

Interest rates in pre-war years on farm mortgages were high for three quite sufficient reasons. In the first place, we were a debtor country, and our prevailing interest rates had to be high enough to attract capital from abroad and keep it here. In the second place, the heavy drain on farm incomes of a high interest rate on an inflexible mortgage tended themselves to make such mortgages risks even to the investors. And in the third place, the banker was more interested in the short-term loans to business and to manufacturers; and investors felt their money to be safer in the securities of railroads, public utilities, and industrials. And that not without reason. For the very security of such investments depended on far-flung lines of transportation on the one hand and the development of industries on the other. As transportation systems extended into virgin territories, the land values back home migrated to the newer regions with the pioneer farmers. The leftovers and leftbehind labor from abandoned farms became the backbone of the factory town. The factories prospered from such labor and they stayed at home with the investor. Such sectional shifts at once caused the banker and the investor alike to look askance at the farm loan and to have faith in the industrial loan and in the loans to the public utilities that grew apace with industrial development.

But with the World War the facts shift, and with the shift in facts comes shift in credit legislation. We move from a debtor country paying a half billion dollars yearly in interest to foreign countries to a creditor country with a half billion of interest coming to us every year. Those who are working to rehabilitate Europe and to develop new countries in the newer continents now pay tribute to us every year: the new creditor country. Money comes in and gets plentiful. Interest rates fall. It pays to begin to look up the old farmer at last to see whether money cannot be loaned more profitably to him. "Yes, the interest rate is lower." "Oh, the inflexible terms are hard on you." "We will get Congress to help." So we have the Farm Loan Bank and the Special Short Term credits and easy payment plans, supported by Federal security and aid. What would have been particularly helpful a generation ago because farmers needed it, now comes easy because investors also want it. But the substance had been changed anyhow: interest rates are lower to everybody, farmers included—and they promise to stay lower. So while credit legislation helps, and wise credit legislation should be encouraged, it no longer can be held to be a solution for our agricultural problems.

Higher Export Prices

A second group of proposals for farm relief center around bolstering up the prices of our exported surplus. No one seriously proposes arbitrary prices, regardless of prevailing prices in the world market, but they do propose in one form or another to make the export price of our farm surplus higher more or less than the world price.

One such plan is the Export Debenture Plan. Exporters of farm surplus are to get certificates in certain amounts worth their face value in paying import duties. Such certificates would, of course, at once have a market value practically equal to 100 per cent of their face value. The amount per bushel of wheat or per pound of cotton or of pork or of pork products or whatever the surplus may be, will be ascertained in different ways, but anyhow the amount has to be sufficient to have some economic effect on the producer, otherwise it is of no avail. In this plan the money going to the farmer would come out of the Federal Treasury through lower custom receipts to the amount of custom duties paid for by these certificates rather than in money.

Other plans would take the money directly from the Federal Treasury and allow some board to decide how much export subsidy should be thus paid. A third group would have this money come from the farmers through a so-called equalization fee. One of the ironies of politics is that many of those who objected to

an equalization fee because it wronged non-participating farmers were soon saying—to win an election—that this subsidy should come from the taxpayers! In the long run, to be adequate and to be just, it must come from the farmers. But of this more at another place.

Regardless of where the subsidy comes from in the first instance, let us examine the assumptions underlying this plan. Are there not these two assumptions:

1. Our domestic market will continue to use all or nearly all of these products, so that the surplus will not be large.
2. The world price will be sufficiently high so that this price plus the subsidy will mean a fair price to the American farmer.

Can we tie a permanent American agricultural policy to either of these assumptions?

Let us examine the first: the future of our domestic market. Many are the folks who argue thusly: It is only a decade or so until our domestic market will consume all our farm products. Then we can slam tariffs on agricultural products and keep farm prices up to an American living standard. So?

In the first place, we have tinkered with our birth rate. By restricting immigration and by emphasis on American living standards our birth rate is not keeping up to old levels, nor are consuming mouths being increased by large numbers of adult arrivals.

I complain not of this. Much is to be said for a higher living standard: better health and better training of small families. But eating farm food is not one of them. We now have in this country about the same number of children in the first grade in our schools as we had six years ago. I do not conclude from this that our population is not going to grow. The span of life is longer. But the rate of population increases of past decades will not continue. Of that we can be certain. Recent statistics tend to show at least no increase in birth rates in Europe. So the population grows more nearly static there also.

But the slowing up of birth rates is not the big fact. The big fact is that quantitatively per capita consumption is declining. While it declines it shifts. It shifts in ways advantageous to some farmers, notably dairymen. But the big beef eater has passed, and the gourmand. City life will not stand its pace on an overloaded stomach. Dietitians teach children not to overeat (unduly). We are all eating less (to our good), and we are eating lighter foods. We are eating more fruits, milk, vegetables, and less of the staples. But that does not help farm markets, on

the whole, though it may for the time help dairy farmers or fruit, sugar, or vegetable growers. A declining per cent of the total family budget goes for food, leaving more of the income for other purchases. And so the manufacturer does not feel the decline in rural purchasing power as he otherwise would.

It seems, therefore, that our total domestic market for farm products will slowly and conservatively expand—but at a declining rate. And this declining rate comes just as scientific farming gives a terrific punch to increased production. The efficiency of agricultural workers has increased about 3 per cent per year since the World War.

Any one of two dozen factors now in use will *alone* take care of this increasing market. Here are just a few of them:

Better selection of dairy cows is giving an increased output with fewer cows.

Better feeding is getting better output from the same cows.

Motorizing farm work has already released by fewer horses some 10,000,000 acres of hay; 8,000,000 acres of corn, and 6,000,000 acres of oats for other purposes.

Improved farm implements are increasing, notably the output per worker. Better and cheaper fertilizers multiply production from the same acreage.

Land is being put more nearly on a full-time basis than ever before.

Manufacturing processes are utilizing foods for both humans and animals, heretofore largely wasted.

Recent improvements in growing and picking cotton are releasing large acreages in southern states for dairying and other purposes.

From 1920 to 1924 our farm population declined 10 per cent and our agricultural production increased 5 per cent. Our production right now is increasing more rapidly than our population. And so we might go on. Are we soon to have a deficit on our domestic market? Is it not just as probably that we could for a substantial period feed the industrial world? Who can foresee the end to profitable output under scientific farming? Who can face the facts and place any reliance on a deficit domestic market as the sole solution to our farm problem? Especially since the trend recently in our exports is *upward!*

There are some factors that should be weighed on the side of better domestic markets. One of these is a growing industrial use of present farm output. I refer to the use of cornstalks

for paper and rayon, and of grain alcohol for gasoline, etc. But here again other substitutes offer so as not to permit too rosy a view of this type of market so far as substantial increase to net farm incomes is concerned.

There is another easy assumption, and that is that the world market price plus any reasonable subsidy will assure the American farmer an American standard of living.

But there are changes going on elsewhere as well as here. All the changes making for increased output at lower cost going on here are being adopted elsewhere also in varying degrees. Thus Europe notably is learning to double her dairy output from the same pasture acreage by better pasture cultivation and the use of fertilizers. At an increased cost? Yes. But not at a cost so much increased above returns. No, she will never double her milk output probably. But she will have greener fields and fewer acres in those crops, such as the cereals, that mean barren cultivated surfaces and hence greater soil losses.

Our virgin prairie and forest soils when put to agricultural production fed not only our cities, but largely European cities as well, and we forced English and most continental agriculture well nigh into bankruptcy. Such resources are gone with us, but in other climes north and south, new acreages open up. Argentine and New Zealand are about where we were in the eighties. The long sunlight of northern hemispheres, notably Canada just now, is ripening wheat and oats as the shorter hours to their southward never can.

No, we cannot assume that the world price plus a little more will solve our agricultural problem. It will help to the extent that it helps. But at its best—or worst—that cannot be much nor life lasting. To spend $300,000,000 per year will mean $50 per family per year. Great credit is due those who champion such plans. They at least show that they can face facts as they see them and that they are ready to do something more than talk. Our agricultural situation cuts athwart our national life too deeply to waste time with the "much-talkie-little-doie" crowd. And such subsidies will prove useful in tiding over essential production changes. But subsidies shorn of production or marketing guidance can be harmful.

The Tariff as a Cure-All

Another assumption is that the farmers' ills will all be cured by the tariff. The tariff costs the American farm family from $30 to $50 per year. Can the farmer ever get back what it costs him? "Yes," say the tariff advocates, "because he will

have such a fine domestic market." But a city domestic market means a declining per capita consumption as we have seen. "True, but a tariff will mean more people in the cities." How? "By immigration." But we are restricting immigration—"then by giving a better wage in the cities for the sons and daughters of the farm." That is no doubt correct. Does that help the farmer? If so, how much is it worth? "But the continuance of a tariff policy will build up a domestic market in excess of domestic production and hence will in time make possible a protection that protects the farmer." But has it? Does it? Will it?

The answer must lie in a careful analysis of the production and consumption of our main farm products. Such an analysis shows:

1. No hope for general cotton protection within any reasonable period.
2. No hope for wheat protection save for minor grades within any reasonable period and that limited protection we now have.
3. No hope for hog protection within any reasonable period. Hog production in Europe is already up to pre-war standards, and promises to stay there on cheap Argentine corn alone.
4. No hope for corn protection so long as we export corn through pork and sell pork products at world prices, though we can and do keep out some direct shipments of Argentine corn.
5. No hope for the potato grower. For though we import few potatoes our production is so ample for domestic consumption and production so multiplies with "400-bushel" producers, that there is no hope in sight, anyhow.
6. No reasonable protection is in sight for the tobacco grower. We export a substantial part of our production.
7. There is at present real protection to the dairy farmer with production increasing so fast that the day cannot be far distant when our production will fully equal our consumption and we must squarely face whether we will limit production or meet export prices, or do something of both.
8. There is present protection for beef cattle with a declining per capita consumption and increasing production costs.

Such is the situation under present facts without regard to the shifts in output and consumption indicated above due to scientific production, which is increasing production (and exports) as land values go down.

Those who can find in the tariff in the face of such facts any basis for a permanent solution of our agricultural problem are only finding what they are bent on looking for. The facts are all the other way.

On some farm products the tariff is now and will continue to be helpful. As such the farmers are entitled to all that help they can get—doubly entitled to it because the votes of their representatives have gotten true protection for others while telling the farmer that he too was reaping its benefits.

Much is to be said for our high price market kept so by tariff walls and restricted immigration. But the farmer buys in the main in this, the highest price market in the world, and sells in the lowest. Of all the good things to be said for the tariff, therefore (and they are many) farm relief is not one of them.

What A Federal Marketing Board Can Do

What a Federal Marketing Board can do depends in the first place on the stamina and will to do of that Board. A weak vacillating Marketing Board dominated by visions narrower than the task and by those lukewarm or adverse to the farmers' interests can do nothing. Worse, it can be positively harmful.

But granted the will for a real board with vision, power and money, it can do much of lasting benefit and of fundamental importance. Here are just a few of the things it can do.

First, it can stand on the shoulders of the constructive fact finding and policy making work of the Federal Department of Agriculture. That work in the main is well and capably done. It has been hamstrung at times in its history by the domination of those who wanted cheap farm products at any cost. It has suffered from vacillating policies. It has had growing pains. Young employees of vision and training have been replaced by office holders, entirely too often for the good of our country. Its policies have been made subservient to the dominant policies of given administrations. Politicians have played with it even to swapping patronage for appropriations. Such defects and limitations must be admitted by its best friends.

But yet it has grown in power, in vision and in usefulness. Despite these handicaps it has grown. Because of the growing need of the great interest it represents.

How can a Marketing Board improve on what the Department has done and is doing? By greater and truer vision; by a

determination to win, just because it represents more completely than any one man ever can all the interests of agriculture; by having more money to spend than it is well for any one man to spend; by justifying its existence through service; by assuring continuity of marketing policies in a way that changing cabinets cannot.

To do this it must be truly representative of agriculture backed by a national opinion that this bedrock industry must and should thrive—reasonably thrive at least. And how can we best move toward that end? By astute, persistent, practical marketing. By making the most out of every one of our national assets, be they agricultural, industrial, banking, or transportation.

Some Essentials in a Marketing Policy

In the market lies the answer to farm prosperity as to any prosperity. This Board must help market. The market includes production, selling and consumption. Our marketing can be vastly improved by strong policies in the hands of those with market sense. And how?

Consumption can effectively be drafted into channels more in keeping without national interests both at home and abroad.

And let us start abroad first. Our foreign policies should certainly be shaped only after their full effects on any agricultural situation are weighed. We should have policies looking toward our agricultural sales as well as our industrial sales, neither to the exclusion of the other. In guiding our growing foreign investments our future agricultural markets should have their just share of consideration. And this will be of increasing effect.

International transportation systems should become an integral part of our agricultural policy. The St. Lawrence Waterway will do more than save our Plains farmers two or three cents a bushel on wheat. It will bring the Atlantic Ocean to the Mississippi Valley. Products will come in as well as go out. And that Great Valley will the sooner come into its own industrially. The Mississippi Barge Canal should make of every port on that river a port on the Gulf. Our merchant marine policies are of outstanding importance in a permanent agricultural policy. Such a board will ever keep its weather eye on cheap and ever cheaper transportation to and from our markets.

Such a board should take a look at our domestic railway rate structure. Here are literally a thousand questions vital to a national as distinct from a sectional farm policy. Some rates give too little heed to long haul costs, some too much. Congress has directed that consideration be given this. And the Interstate Commerce Commission has proceeded with about as much vigilance as one could expect when no advocate is at hand.

Such a board should immediately set out for a survey of those marginal lands now nominally in agriculture that should revert to our national or state forest or grazing domain. Vast acreages should be abandoned in excess of the vast areas already abandoned. Sums of money should be available first for this survey, and second for the transportation of poverty-stricken farmers in these areas to other areas where employment suited to their capacities can reasonably await them. I do not suggest compensation. I suggest only that we be human enough to help these bankrupts get a new start. Nor do I suggest this because it will lower production. One good farmer on one small farm can produce as much surplus as 1,000 of these destitutes are producing. I suggest this first as a humane thing and second as an essential step toward water and soil conservation, and a permanent national policy toward our forest and land resources.

Such a board must work with and through forces that will adapt our output to our best markets with full reference to returns, to consumption demands, and to the longtime needs of a national agricultural policy. For instance, I venture to say that adequate surveys would reduce wheat and oats acreage in most of our states. We can profitably grow wheat in competition with the world market on large specialized wheat farms with machinery that will take two hours of man labor where twenty are taken on the average small farm today. We can afford to grow wheat as a nurse crop in certain sections. Such adjustments would put wheat on a profit basis in most places where it would still be grown even though we still have a substantial exportable surplus.

The boll weevil is moving our cotton acreage westward into drier and northward into cooler regions. In these newer regions epoch making changes are being made through machinery for picking and handling cotton. This means a new revolution in agriculture in our Old South. It no doubt means also that we continue to be a major factor in the world's cotton market. The Old South is importing dairy cows. Think of the help such a Federal Market Board can give in this adaptation. Established dairy sections can alone appreciate the changes necessary to get good dairy help in the old Southland. It's one thing to buy a good Jersey cow; it's quite another thing to keep her and her offspring productive of net income over a period of years.

Making the Most of our National Advantages

In shaping such a marketing policy the board should make the most of our national advantages. One of these is large scale farming. We shall have both gardens and large estates. The proportion need not be set up now. Let us make the most of each. Let us have specialized farms where profitable.

We have the lead in the world on scientific farming. The megaphone such a board will have can alone keep us a lap ahead of any other country for some time to come at least. We must not stop our progress. We must make more of it.

We have large scale buying and selling. All the advantages in that we should keep. Large scale business is part of our national flare. Let us profit by it. This includes our great grain and cattle markets.

We have large scale distributing facilities in milk, in milk products, in milling and other companies. Let us make the most of their every advantage, and their advantages are numerous. How silly it would be to break these up when other countries are now securing them at such heavy financial and social cost.

We have our huge banking and investment houses. Let us tie them right into our agricultural marketing policies. Myriad are the ways this still can be done.

Let us have a new survey of all our special advantages as compared with other nations. And let us under capable and farsighted guidance make the most of every one of them in this marketing policy. And in these advantages let us never forget that the first and foremost is a hard working dependable worthy people trained for progress, under an educational system that will mean mobility in labor responsive to mobility in capital.

Cooperatives

The beginning of wise marketing is the product. The product must be suited to the demand, and the demand suited to the product. Consumption standards change and under modern facilities for fact dissemination will change ever more rapidly.

Producers must adapt their product to the market with every changing consumption standard, even fancy or whim. This they must do on a regional scale, and on a national scale. Nay, the nation alone will not do any more. On an international scale, if we are to take our place in the world's sun. And that we must do, if for no other reason than that pointed out above: we have to, or limit production.

Now, how can standard of product on a large scale quickly adaptable to production on the one hand and consumption on the other be secured? Every way has been tried once. High prices have been tried spasmodically with havoc. National subsidies have been tried with havoc. "Whoopee" campaigns for this and that have strutted their stuff and expired. One way only has gotten farm results and that way lies through agricultural cooperatives.

The cooperative must have power to enforce its standards; that a national law and a national Farm Board can give it. The cooperative must be organized on a scale as big as its business. That can be assured most completely and economically through national legislation and through the guidance of a national Marketing Board. Money here will help if spent with an eye to returns, and to make cooperatives self-supporting and self-directing.

A national law should make possible financial aid to self-supporting cooperatives with their own fees during their early years of establishment. More than this will be detrimental to farmers themselves. In this period of adjustment export subsidies may be tried out on a limited basis, but only until a marketing plan is full grown. Nothing will destroy cooperative marketing so soon as overstimulated production. These things under Senator McNary's Bill now before Congress all are possible.

These are the necessary outward forms of an inward life. The forms all can be lifeless.

The life of the cooperative is the will to market advantageously.

That means first adapting production to markets.

That means standards.

That means adaptable standards.

That means good will of both producers and consumers.

That means marketing sense, and marketing sense is rarer than horse sense even in this day of vanishing horses.

Marketing sense comes from marketing on a scale big enough to get the feel of every marketing factor.

And so our Federal Marketing Board holds promise for success just in so far as it is built on self-directed, self-contained cooperatives.

Produce? They can produce their heads off if that means greater net returns. But every producer will know his why and

wherefore to an extent he never can know them without. The farmer will be in on and know about all the facts in his fate. That may mean more farm abandonment. It may mean more grassland. It may mean—and probably will—fewer cereals grown. Anyhow, it means knowledge.

And knowledge is power—the only power in the last analysis marketing sense can be built on.

And marketing sense is the beginning and end of a permanent agricultural policy for our country.

Herd Honor Roll

A LIST OF

Cow Testing Association Members

Who Won a Place On the Herd Honor Roll

And were awarded ribbons for Herd Production average of 300 pounds, or more, of butter fat per cow.

HONOR ROLL

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Adams County, Adams Association					
R. M. Spangler	Gettysburg, No. 7	8	H	12050	387.1
Elmer A. Bubb	East Berlin	10	H	10473	349.5
Millard Basehoar	Littlestown	15	H	10661	347.8
Hiram H. Miller	Fairfield	7	H	9958	322.8
Edgar H. Leer	York Springs	15	H	9996	322.3
T. N. Cashman	York Springs	8	H	9843	322.0
Harry E. Brown	Fairfield	14	H	9459	312.4
Allegheny County, Allegheny Association					
Bell Farm	Coraopolis	105	H	13572	430.8
Robt. Bamford & Son	Midway	21	J	7830	410.7
Farmhill Dairy	Sewickley	10	G	8119	402.5
Adarra Herd, Inc.	Sewickley	7	H.J.	10472	398.4
Fairacres Farm	Sewickley	8	G	8069	398.1
J. F. Byers	Sewickley	6	G	7852	367.3
H. O. Bock	McDonald	10	J	6835	359.3
Blackburn Farm	Sewickley	14	A	9407	353.5
Vance H. Bell	Imperial	20	J	5867	313.7
Allegheny County Home	Woodville	68	H	9573	308.1
Bell Brothers	Imperial	15	H	9009	306.7
Bedford County, Bedford Association					
Allen R. Eshelman	Everett	14	J	7546	432.2
E. S. Ferry	New Enterprise	10	J	7646	428.9
Stanley Koontz	Bedford, No. 4	15	J	7438	416.9
George Greenawalt	Hopewell	7	J.H.	7524	410.5
George Morgart	Rainsburg	27	J	7990	410.2
Harry Clark	Breezewood	10	J	6914	401.1
McKinley Way	Everett	8	G.H.	7749	397.5
John E. Morris	Everett, No. 3	7	J	6955	384.0
Ernest Replogle	Loysburg	12	H.J.	8506	383.3
Fred W. Coxe	Everett	18	J	7499	382.6
Samuel L. Cessna	Bedford, No. 4	14	H	9859	378.1
John L. Baughman	Everett	4	J	6179	372.0
C. E. Koontz	Lutzville	15	J	6482	365.9
Grover Ritchey	Everett	6	J	6660	350.1
Dennis Koontz	Lutzville	10	H.J.	7998	348.8
Carl Garland	Buffalo Mills	14	H	8981	346.7
Lloyd H. Diehl	Bedford	21	J	7104	343.4
J. W. Stair	Hyndman	10	H.J.	8508	317.5
S. U. Troutman	Bedford	8	J	6153	314 5
H. B. Hull	New Enterprise	12	H.J.	7751	305.4
Francis Baker	Everett	18	J.H.	5944	304.6
Bradford County, Canton Association					
W. F. Bohlayer	Canton	20	H	10648	409.6
H. S. Wilcox and John Brackman	Canton	14	G.H.	8543	380.8
R. H. Fleming	Alba	20	H	9804	361.4
Theron Freeman	Granville Summitt	11	H	10541	345.8
Wm. Packard	Granville Summitt	13	H.G.	8045	344.4
Clarence Spencer	Canton	17	H	9233	340 9
D. D. Holliday	Canton	12	J	6993	327.7
J. C. Fleming	Granville Summitt	5	G	6436	325.2
Elwin Baldwin	Canton	14	H.J.	8691	323.8
H. G. Wright	Canton	13	G	6735	320.6
Dillon Stone	Canton	13	H.J.	7812	315.9
James Davison	Canton	18	J	6083	314.3

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Bradford County, Laurel Hill Association					
Clarence Grenell, Jr.	Ulster	10	G	6999	432.1
J. R. Doane	Powell	24	H	9024	377.4
I. P. Chaffee	Towanda	17	J	6604	373.7
Chas. S. Chaffee	Ulster	19	H.G.	9343	350.6
A. E. Madigan	Towanda	15	H	9047	341.9
Jas. E. Meredith	Towanda	21	H.G.	9209	333.0
R. B. Arnold	Milan	25	H	9299	331.6
J. G. Kerrick	Towanda	13	H.G.	8925	330.1
Robt. S. Young	Columbia X Roads	13	G	6036	326.1
Hugh Ockerman	Troy	15	J	6017	309.0
Frank O. Kuhns	Towanda	12	H	7357	306.2
Bradford County, Leraysville Association					
Albert Dewing	Owego, N. Y.	11	G	7582	382.2
C. L. Lent	Rummerfield	11	H.J.	7879	333.8
Claude S. Gorham	LeRaysville	15	J	5589	321.6
Rowland Jones	So. Apalachin, N. Y.	12	H	8766	316.0
L. D. Whited	LeRaysville	8	G.H.	7366	310.3
Miles Chilson	Nichols, N. Y.	11	H	8285	307.0
Bradford County, Troy Association					
Earl C. Brooks	Ulster	8	J	6115	358.8
H. H. Packard	Alba	13	H	8916	331.4
Ben Ballard	Troy	19	H	9301	317.3
Joab K. Mahood	Columbia X Roads	10	H	8433	302.7
Bradford County, Wyalusing Association					
Fitzgerald Bros.	Wysox	16	H	10522	373.2
E. M. Miller	Towanda	15	H	11020	358.5
Stanley Allis	Rummerfield	8	H	9600	346.9
Karl Shiner	Towanda	10	J	7312	345.0
S. L. Culver	Laceyville	21	H	9801	340.2
Francis & Sheldon Kerrick	Towanda	21	H.G.	9249	331.7
Howard Barnes	Towanda	11	H	9445	330.1
John Howard	Wyalusing	20	H	8866	317.9
A. L. Beaumont	Stevensville	10	H	9328	307.5
C. B. Culver	Laceyville	29	H	9966	306.2
R. L. Blocher	Wyalusing	16	H	7810	305.4
Bucks County, Middle Bucks Association					
J. M. Geddes	Danboro	10	J	6749	390.8
E. J. Ivins	Feasterville	10	H	10681	382.0
L. P. Satterthwaite	Newton	18	H	11490	379.7
W. N. Hunsberger	Plumsteadville	15	H	11400	375.9
P. W. Smith	New Hope	14	G	7598	359.9
C. L. Wilkinson	Rushland	13	H	10015	343.4
J. H. Cliffe	Ivyland	18	G.H.	7363	321.7
L. C. Benner	Langhorne	11	H.J.	9063	316.0
Jos. Canby & Son	Hulmeville	32	H	9053	311.1
George S. Havens	New Hope	9	G	6139	308.3
E. B. Morris	Bristol	34	G	6106	307.9
H. M. Walton	New Hope	14	G	6928	306.0
J. S. Parry	Rushland	28	H.G.	6613	300.7
Butler County, Butler Association					
Ed. S. Cooper	Slippery Rock	9	G	7473	409.5
H. P. Starr	Valencia, No. 2	9	H	11552	404 1
J. C. Roberts, Jr.	Mars, R. 1	7	H.G.	10830	403.5
Merle Jones	Evans City, No. 1	6	H	10070	391.2
Alex Martin	Gibsonia	11	H	10089	364.1

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
A. W. Zillifro	Slippery Rock	6	J	7393	363.8
William Davis	Slippery Rock, No. 2	14	J	6492	359.3
John Reefer	Zelienople, No. 1	7	G	7032	351.5
Giallambardo Bros.	Valencia, R.2	11	H	10726	344.6
Thomas Cooper & Son	Euclid, R.2	12	J	6046	342.7
C. L. Peffer	Portersville, No. 2	7	G	6905	334.0
Paul Barkley	Euclid, R.2	7	J	6093	328.1
H. L. Roenig	Cabot, R.2	9	H	8695	326.5
H. E. Kennedy	Cabot, R.D.	9	H	8962	323.9
J. C. Belles & Son	Harmony, R.2	16	H	10013	322.4
Robert Dickey	Slippery Rock	8	G	6363	319.3
Carbon County, Carbon Association					
L. A. Zimmerman	Lehigh, R. 1	22	H	13655	467.5
Wm. Steigerwalt	Lehigh, R. 5	16	H	10949	395.1
Burton McLean	Lehigh, R. 1	10	H	10037	344.7
F. C. Behrens & Sons	East Mauch Chunk	31	H	8707	316.7
C. D. Frey	Lehigh, R. 1	14	H	8668	311.7
Centre County, Centre County No. 1 Association					
Allen Harter	Bellefonte	8	H.G.	12297	459.1
Theodore C. Kryder	Mill Hall	14	H	12128	413.0
A. C. Hartle & Bros.	Bellefonte	14	H	11815	405.5
George P. Gummo	Mill Hall	15	H	11781	386.5
Peters Brothers	Port Matilda	11	H	10267	378.6
W. C. Krape	Bellefonte	12	H	10516	361.5
Epley White	Bellefonte	9	H	9690	347.4
Geo. H. Wilson	Bellefonte	10	H	9543	345.8
Peck Brothers	Nittany	8	H	9811	339.1
Western Pen.	Bellefonte	74	H	9461	334.5
J. G. Miller	Pine Grove Mills	15	H	9704	332.0
Hugh Wilson	Warriors Mark	9	G	7660	331.5
Paul Bradford	Centre Hall	16	H	9800	327.8
Nolan Brothers	Nittany	20	H	9625	323.5
F. S. Bowen	Bellefonte	9	H	8469	314 2
John Dunkle	Mingoville	8	H	8589	300.7
Centre County, Centre County No. 2 Association					
J. Fred Slack	Centre Hall	11	H	11315	409.5
S. F. Esterline	Greenburr	11	J	7121	377.4
J. Victor Brungart	Smullton	10	J	6892	359.2
R. C. Bair	Smullton	9	J	6850	340.3
W. F. Rishel	Centre Hall	8	H	9449	301.6
Henry J. Stover	Aaronsburg	8	H	7929	300.0
Chester County, Chester Valley Association					
Mrs. Mary N. Carter	Pocopson	16	G	8064	396.1
David Byerly	Glen Moore	23	J.H.	7742	376.8
C. Albert Fox	Pocopson	20	J	6807	369.1
Wallace C. Pearson	Downingtown	22	J	6825	356.6
C. E. Mather	West Chester	21	J.G.H.	8079	362.6
James Latta	Parkesburg	13	G.H.J.	7492	341.5
David Stoltzfus	Elverson	16	G	6870	323.6
Wm. M. Lloyd	Downingtown	21	J	6108	318.1
Fairlamb Beale	Coatesville	13	J	6528	317.4
Richard L. Fox	Downingtown	20	G	6682	315.5
Edw. Hoopes	West Chester	21	J	5736	310.2
Jonathan P. Styer	Glen Moore	14	H.G.	8080	309.5
Hayes C. Taylor	Embreeville	20	G	6100	307.9
Albert W. Hoopes	West Chester	37	J.G.H.	6309	302.0
N. K. Beach & Chas. Ash.	Parkesburg	26	G	6314	301.9
Harry Dague	Whitford	27	G	6464	300.0

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Chester County, Coventry Association					
State Institution	Pennhurst	85	H	11567	404.6
Porter Farms	Phoenixville	35	G	7480	374.5
Arthur High	Pottstown, R. 2	10	H.G.	10381	361.4
H. L. Stoltzfus	Pottstown, R. 2	17	H	10191	347.5
Wm High	Phoenixville, R. 4	16	H	9982	336.0
Harry J. Bickel	Pottstown, R.D.	17	H	9234	323.5
F. H. Harjes, Jr	Valley Forge	17	G	6663	321.8
Furman H. Gyger	Kimberton	24	H.G.	8404	306.3
Henry Supiot & Sons	Phoenixville	24	H.G.	8722	305.6
N. A. Matthews	Pottstown, R. 2	14	H	7725	300.9
Chester County, Oxford Association					
Norman Thompson	Oxford	17	J	8304	385.3
Harold & L. O. Hansen	Oxford	17	H	10644	374.8
J. S. Reisler	Calvert, Md.	8	G	7685	352.9
James Hastings	Kirkwood	22	J	6245	314.5
Chester County, West Chester Association					
F. Forsythe, c/o Wm. Vandergrift	West Chester	25	C.A.	7733	352.0
Wm. I. Reeves	West Chester, R.D.	15	G	7230	345.4
R. E. Sharpless	London Grove	39	J	6810	344.0
M. L. Jones	Westtown	147	H	9445	314.1
Garrett-Wmson Lodge	Newtown Square	19	H.G.	8683	313.8
Wm. B. Rhoads	Oakbourne	20	H	8870	304.4
Clarion County, First Clarion Association					
L. O. Hetrick	St. Charles	7	G.J.H.	9608	478.0
H. B. Hetrick	Mahoning, R.D.	7	J.Sh.	7369	404.3
J. P. C. King	Summerville, R.D.	6	H	11720	396.1
C. P. Willison	Mahoning, R.D.	6	G.H.J.	8142	389.5
Ross Barrett	Mahoning, R.D.	7	G	7342	365.5
Wm. & C. A. McCauley	New Bethlehem, R.D.	12	H	9270	363.0
Fred Eaker	New Bethlehem, R.D.	7	G.J.	7523	349.1
Ray Shook	Sligo, R.D.	13	G	7346	346.9
C. L. Risher	East Brady	21	H	8842	323.0
H. G. Smathers & Son	New Bethlehem, R.D.	7	G	7182	320.2
J. W. M. Gruber & Son	Shippenville, R.D.	20	G	6240	315.1
Clearfield County, Clearfield Association					
C. E. Hoyt	Sabula	11	J	10018	507.2
Mrs. J. A. Liddle	DuBois	8	H.G.	9316	398 2
John Flood	Woodland	11	H.J.	7140	329.4
G. B. Wachob	DuBois	6	G.H.	8418	320.6
Roy Wingert	Luthersburg	9	H.G.	7352	317.2
S. R. Thompson	Philipsburg	17	H.G.	6995	312.7
C. O. Mattern	Osceola Mills	9	G	6612	304.5
G. E. Taylor	Clearfield	10	G.H.	6958	303.4
James Mullen	Woodland	12	J.G.	7041	302.2
Crawford County, Eastern Crawford Association					
W. W. White	Centerville	6	H	9360	326.3
Mark Kelly	Centerville	9	H	10272	319.9
Roy M. Bewley	Corry	9	H	9168	314.9
Arthur Morris	Corry	9	H	9098	313.2
Crawford County, Saegertown Association					
Arthur Wasson	Meadville, R. 1	11	H.J.	9278	362.2
Burl Hayes	Edinboro	16	H.G.J.	9347	346.5
Riverside Stock Farm	Cambridge Springs	26	J	5827	325.3
H. C. Drissel	Saegertown	9	J	6060	304 9
William Burge	Saegertown, R. 2	14	H.J.	7959	300.3

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Crawford County, Titusville Association					
A. K. Hummer	Titusville	21	H	10659	381.2
Merle W. Ongley	Centerville	9	H	10529	355.2
George Matteson	Centerville	13	S.H.	8605	335.3
Clyde Vosburg	Titusville	9	J	6345	332.9
L. B. Carter	Titusville	35	J	5709	327.3
Will Hasbrouck	Titusville	12	H	9829	315.4
Wayne Langworthy	Centerville	10	H	9977	308.9
Albert Hasbrouck	Centerville	10	H	8786	308.0
Central Pennsylvania Guernsey Breeders' Association					
D. A. Morrow	Tyrone	7	G	8619	421.3
S. H. Markey	Loysburg	7	G	9547	420.6
Webster Griffith	Ebensburg	22	G	8891	405.7
J. W. Burket	Tyrone	9	G	8485	389.8
Wm. Morrow	Tyrone	11	G	7910	373.6
W. J. Hoover	Patton	5	G	6926	369.8
W. J. Karlheim	Dysart	8	G	7214	363.9
M. C. Bagshaw	Hollidaysburg	14	Sw.	9095	357.0
Elmer Leighty	Duncansville	8	G	7088	351.0
Mrs. C. M. Schwab	Loretta	18	G	6655	349.4
J. E. Hindman	Tyrone	16	G	7141	345.7
E. H. Karlheim	Patton	7	G	6188	338.4
G. Clair Smith	Martinsburg	13	H.G.	9852	338.0
P. C. Smith	Martinsburg	11	H.G.	8896	334.1
S. B. Wasson	State College	19	G	7291	334.1
A. J. Yahner	Patton	10	J	6113	330.4
K. S. Bagshaw	Hollidaysburg	10	B.S.	8314	327.7
Jos. Swires	Philipsburg	10	H	9175	324.2
Earl Karlheim	Patton	13	G	7053	323.6
Paul Hoover	Patton	12	G.H.	7115	316.7
Knarr Bros.	Du Bois	28	G	6648	316.4
L. W. Kline	Cresson	13	G	7152	309.7
Wm. Montgomery	Duncansville	8	Mixed	7488	305.8
George Sloppy	Du Bois	9	G	6914	300.9
Crawford County, Western Crawford Association					
Bush Bros.	Linesville	22	H	11812	401.4
Ross A. Corey	Conneautville	18	H	9700	351.9
R. J. Adsit	Conneaut Lake	6	J	6528	332.4
C. M. Bean	Conneautville	15	H	8924	323.1
J. S. Patton	Adamsville	19	H	8962	319.9
Dodds Bros.	Adamsville	11	J	7076	317.5
Ray McConnell	Atlantic	6	H	8969	314.1
W. S. Andrews	Adamsville	14	H	8861	312.7
Arthur Hirschman	Espyville	21	H	8804	306.9
Andrews & Reaugh	Adamsville	14	H	8708	304.2
J. D. Leach	c/o C. D. Sprout Meadville	15	H	8630	303.0
Cumberland County, Cumberland No. 1 Association					
I. V. Otto	Carlisle, R. 6	22	H	12600	435 5
Paul Gibble	Mechanicsburg, R. 2	9	H	11953	423.1
E. R. Shughart	Carlisle, R. 9	6	H	11750	406.3
J. H. Lear	Carlisle. R. 5	12	H	10728	892.1
E. C. Ludt	Carlisle, R. 5	14	H	11384	383.4
H. K. McCullough	Newville, R. 1	20	G	7838	361.6
A. E. Rider	Mechanicsburg. R. 5	13	H	9753	340.0
J. W. Raudabaugh	Carlisle. R. 7	19	H	10326	337.9
H. B. McCormick	Harrisburg	8	G	7018	333.0

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
A N. Lehman	Carlisle, R. 2	16	H	9403	331.2
Geo. E. Wilson	Mechanicsburg, R. 2	8	H	8882	328.8
J. N. Kruger	Carlisle	18	G.H.	7848	328.6
William S. Ker	Carlisle, R. 9	16	H	9672	325.0
J. B. Sellers	Carlisle	8	H	8665	318.5
Albert Kost	Carlisle, R. 7	12	H	9147	309.6
Paul Lehman	Carlisle, R. 2	13	G.H.	7723	306.4
Miss Anne McCormick	Harrisburg	10	G	6749	303.3
S. W. Zeigler	Mechanicsburg, R. 1	14	H	8531	303.1
Cumberland County, Cumberland No. 2 Association					
Harry Shultz	Carlisle, R. 6	19	H	10257	360.6
A. G. Wingert	Mechanicsburg, R. 5	9	H	10864	356.4
Hugh McMeen	Carlisle, R. 6	16	H	9569	353.5
William G. Minnich	Carlisle, R. 6	9	H	9864	347.3
Loy F. Hare	Boiling Springs, R. 1	9	H	10708	341.4
W. A. Woods & Son	Carlisle, R. 8	9	H	9542	324.7
Harold Evans	Carlisle, R. 8	6	H	8818	310.1
J. Paul Wrightstone	Camp Hill, R. 1	16	H	9353	308.4
Geo. Raudabaugh	Carlisle, R. 4	9	H.G.	8565	306.6
John W. Myers	Shippensburg, R. 1	9	H.G.	9264	300.9
Erie County, Waterford Association					
H. H. Marsh	Waterford	13	H	9687	346.6
Clayton McCray	Corry	16	H	9198	318.1
A L. Proctor	Corry	14	H	9746	314.6
A. B. Bittles	Waterford	20	H	8688	300.6
Erie County, Wattsburgh Association					
Karl Rockwood	Waterford, R. 7	14	H.J.	8956	330.4
Geo. Robinson	Wattsburg, R. 4	30	Mixed	8328	305.6
Gerald Johnson	Wattsburg, R. 3	15	H	8632	301.9
Franklin County, Southern Franklin Association					
J. A. Gsell	Chambersburg	13	H	9672	360.2
John Martin & Son	Smithsburg	8	H	9464	334.1
G. D. Baumgardner	Waynesboro	8	G.H.	7722	330 9
J. Myers & Son	Waynesboro	15	G.H.	7982	327.5
C. Barnhart	Chambersburg	13	H	9379	315.4
D. E. Rinehart	Smithsburg	11	J.G.H.	7357	312.4
Cyrus Stauffer	Smithsburg	16	H	8597	303.3
Herman Oller	Waynesboro	9	G	6691	303.3
Franklin County, Western Franklin Association					
John Aughinbaugh	Mercersburg	10	G.S.H.	8082	357.5
Howard S. Myers	Mercersburg	6	S.J.	7419	336.2
J. W. Hoffeditz	Mercersburg	12	G.H	7033	319.8
C. T. Hawbaker	Greencastle	5	H	8148	310.7
Huntingdon County, Huntingdon Association					
A. S. Ellenberger & Son	Warriors Mark	8	H.G.J.	9811	396.6
F. W. Eyer & Son	Tyrone, R 5	30	H.G.	9769	363.7
Harry R. Oaks	McAlevy's Fort	12	G	7747	349.1
H. L. Grazier	Warriors Mark	11	BS.	8779	341.4
Guy M. Neff	Alexandria	7	H.G.J.	8228	338.6
Taylor Brothers	Warriors Mark	21	H.G.	8200	336.6
John T. Martin	Alexandria	13	H	9378	332.3
Norman E. Black	Alexandria	12	G.H.	7784	331.7
Walter Henderson	Petersburg	16	BS.G.	8327	330.6
J. Harry Stewart	Petersburg	9	H.G.	8208	327.2
J. B. & H. B. Tussey	McAlevy's Fort	11	H	8718	323.7
A. L. Guyer & Bro.	Tyrone, R. 1	8	H.BS.	9421	319.3
Geo. Rumbarger & Son	Warriors Mark	14	H	8627	319.1

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Indiana County, Indiana No. 1 Association					
Clyde Houck	Clymer, R.D.	7	J	8321	420.4
H. O. Kimmel	Shelocta	11	H	11318	383.5
Clarence D. Bence	Marion Center	14	J	7143	375.0
H. H. Wetzel & Sons	Marion Center	9	J	6573	370.3
R. E. Young	Indiana	9	H.J.	9808	362.0
D. H. Fitzhonts	Homer City	16	J.G.	7094	355.5
Wm. S. Wetzel	Marion Center	12	J	6678	354.7
Wm. McMillen	Home	11	J.H.	8183	350.0
C. F. Glasser	Marion Center	9	J	6616	348.1
Irvin Speedy	Livermore	13	H.G.	8153	327.7
Cream Rose Dairy Farm	Livermore	33	H	8653	300.7
Jefferson County, First Jefferson Association					
W. F. Calhoun	Brockway	6	G.J.H.	10534	451.8
Albert Arnold	Brookville	12	G.H. J.	9638	440.8
R. L. Ross	Brockway	5	G.J.H.	7839	386.3
C. W. Calhoun	Brockway	8	J.H.	8057	382.1
William Irwin Co.	Big Run	11	G	6987	381.7
T. J. Chamberlain	Munderf	11	J	7073	380.8
S. B. Reed	Reynoldsville	6	H	10643	377.1
J. O. Harding	Brookville	7	G.H.	7238	370.6
A. J. Bullers	Brookville	8	G	6405	360.1
C. P. McMinn	Lanes Mills	11	H	10218	352.3
H. A. McIsaac	Rochester Mills	12	J	6477	345.0
Harry Marshall	Brockway	6	H.J.	8146	344.6
Arthur Bullers	Brookville	7	G	6518	331.9
Dr. F. D. Pringle	Punxsutawney	10	G	6824	330.8
Hall Brothers	Baxter	20	J	6900	323.2
C. G. Bullers	Brookville	8	G	6044	320.6
S. C. Beeman	Brookville	18	G	6251	314.9
Calvin Shaffer	Punxsutawney	6	G	6062	300.0
Juniata County, Juniata Association					
E. J. Cunningham & Son	Mifflintown	14	H	14131	453.2
J. W. Seiber	McAllisterville	11	H	11341	376.7
Theorous Kauffman	Mifflintown	14	H	11798	366.7
J. I. Clarke	Port Royal	11	H.G.	9850	359.4
C. I. Degen & Son	Mifflintown	9	H	10036	357.6
Geo. W. Colyer	Mifflintown	9	H	10007	344.8
T. R. Auker	Mifflintown	11	H	10905	342.2
C. D. Stouffer	Port Royal	10	H	10331	332.2
C. A. Musser	Oakland Mills	10	H	9576	329.8
H. I. Gray & Son	Honey Grove	14	H	9819	326.7
Lloyd Heckman	Mifflintown	9	H	10644	323.3
W. E. McMeen	Port Royal	14	H	9745	314.6
Karl A. Fettig	Mifflintown	12	H	9172	313.2
Carl L. Smith	McAlisterville	20	H	9256	309.8
E. G. Ferguson & Son	Millerstown	9	H	8580	303.3
Lancaster County, Garden Spot Association					
Ira M. Eby	Gordonville	16	H	11457	376.9
Mast Stoltzfus	Morgantown	17	H	11289	375.9
Elmer Stoltzfus	Elverson	12	H.G.	9874	346.6
George G. Sauder	East Earl	14	H	9455	317.7
M. V. Brubaker	New Holland	9	H	9656	304.2

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Lawrence County, Westfield Association					
N. E. Sampson	Volant, R. 3	10	J	6850	443.4
H. A. Freed	Beaver Falls	5	H	11099	369.5
W. W. McMillen & Son	Wampum	9	H	10390	369.0
H. L. McCurley	Enon Valley, R. 2	15	J	7103	347.6
J. W. Bronson	New Galilee	15	J	6587	338.5
J. W. Martin & Son	Bessemer	27	J	6543	330.3
E. H. McConaghy	New Castle, No. 6	10	H	7786	329.7
W. K. McCullough	New Galilee	12	H	9209	319.7
Arnold Bros.	Beaver Falls	8	G	6205	315.4
S. P. McCreary	New Galilee	12	H	8526	307.8
Wm. Fox	Enon Valley	16	S.G.	6698	305.6
J. C. Wallace	Edenburg	12	J	5874	303.2
Lauren Thompson	New Wilmington	17	J	5539	302.0
Lehigh County, Lehigh Association					
Wm. H. Rupp	Breinigsville, R. 2	10	H	10971	382.9
M. A. Herber	Breinigsville	11	H	11199	374.0
Harold Ziegler	Wescoesville	9	H	10740	357.0
Robt. L. Schaeffer	Fogelsville	18	H	10053	343.5
Harry C. Trexler	Young Bldg., Allentown	10	J.G.	6647	340.9
P. G. Lichtenwalner	Emaus, R. 1	17	H	9453	338.6
Edwin G Trexler	115 Walnut St., Allentown	9	H	10363	332.8
Adam Schultz	Hereford	14	H.G.	8070	300.0
Lycoming County, White Deer Valley Association					
H. A. Snyder	Montoursville	14	H	14283	526.4
R. D. Hoffman	Montgomery	7	G	8929	408.9
Geo. L. McCormick	Allenwood	12	H	11571	401.5
O. A. Shirey	Williamsport	13	H	11208	381.2
Jos. McCormick	Allenwood	8	H	11274	374.9
J. A. Young	Williamsport	14	H	10082	355.8
P. C. Antes	Williamsport	16	H	9514	330.5
S. L. Nicholson & Son	Muncy	12	H	9877	329.1
John Yagel	Montgomery	15	H	9437	323.7
W. G. Snyder	Hepburnville	15	H	9661	322.0
P. J. Stein	Muncy	15	H	9114	321.9
State Industrial Home	Muncy	21	H	8895	316.5
W. L. Barclay	Jersey Shore	27	H.G.	8477	305.8
S. S. Pauling	Allenwood	9	H	9085	302.1
C. G. Sallada	Montoursville	9	Mixed	8304	301.4
L. M. H. Lesch	Montoursville	11	H	9162	300.0
McKean County, First McKean Association					
F. J. Dieter	Bradford	10	J	7108	361.2
W. S. Fuller	Bradford	15	J	6207	322.1
E. D. Comes.	Smethport	25	H	9814	315.4
F. M. Johnston & Son	Kane	9	G.J.	7331	312.6
R. A. Mosier	Eldred	11	A.H.J.	7747	311.4
Marvin S. Comes	Smethport	25	H	9511	303.5
Mercer County, Grove City Association					
Ralph Gilgrist	Harrisville	9	J	7589	442.5
S. H. Pickford	Harrisville	9	J	7520	415.1
R. E. Critchlow	Harrisville	8	J	7511	414.3
J. D. Baker	Grove City	11	J	6913	406.0
Lee R. Critchlow	Harrisville	8	J	6896	395.4
F. E. McEwen	Mercer	16	J.G.H.	8275	369.0
Hugh Fergus	Slippery Rock	24	G	7368	361.6
A. M. King	Mercer	18	J	6110	359.4
Lucia Paxton	Grove City	6	J	6161	353.3

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
L. G. Pearson	Mercer	12	G.H.	7449	352.9
E. A. McDowell	Grove City	7	J	6701	351.5
G. D. Barnes	Grove City	7	H	9458	348.7
D G. Grace	Grove City	10	J	6560	346.3
J. L. Black	Grove City	5	J	5834	342.2
Pew Estate, M. H. McCoy. Mgr.	Mercer	14	G	6232	322.3
C. C. Welton & G. W. Boundy	Grove City	10	J	5522	311.6
C. M. Worley	Mercer	12	G	5997	307.6
A. D. Philson	Mercer	11	J	5763	302.7
C. E. Reed	Slippery Rock	9	G	5738	302.4
G. B. McDougall	Grove City	11	J	5347	300.0
Mercer County, Mercer No. 2 Association					
H. L. Forbes	Sandy Lake	14	H	12849	476.9
J. P. Porter	Sandy Lake	9	J	7336	377.2
J. Bert Burrows	Sandy Lake	8	J.Mixed	8873	370.0
Mabel Williams	Stoneboro	7	J	7085	364.5
Wm. H. Berrisford	Stoneboro	12	J.H.	8900	364.3
F. L. Powell & Sons	Clarks Mills	11	H.G.J.	8576	341.7
James W. McGee	Jackson Center	12	H.J.	8939	320.5
H. E. Small	Clarks Mills	13	H.Mixed	8416	320.0
M. M. King	Mercer	11	H	9727	317.1
H. M. Hulse	Sandy Lake	9	H	8576	311.5
Wm. Grantham	Sandy Lake	9	G.J.	6556	301.0
Gust Doyle	Stoneboro	15	H.G.J.	7224	300.4
Mercer County, Mercer No. 3 Association					
C. C. Stoyer	Greenville, R. 49	10	G	7768	428.2
Ford Smith	Greenville, R.D.	9	J	6820	417.0
F. L. Minner	Pulaski, R. 62	10	J	7355	344.6
John McEwen	Greenville, R. D.	8	J.H.	7983	342.9
H. B. Edeburn	Mercer, R. D. 1	12	G	6708	338.5
A. S. McCullough	Sharpsville	12	G	6453	337.4
W. H. Crawford	Mercer	25	H.G.	7853	321.3
R. E. Bollenbacker	Greenville	12	H.J.	7847	317.9
A. J. Robinson	Greenville, R. D.	25	G.H.	6409	316.8
W. H. Reinhart	Fredonia	9	H.G.J.	6955	301.6
Mercer County, Mercer No. 4 Association					
R. H. Brenner	Jamestown	22	J	6514	359.4
H. Free Curtis	Jamestown	8	J.H.	8036	357.5
S. S. Artman	Greenville	15	H	10795	351.4
Roy White	Sharpsville	6	H	9240	338.5
Fred Diefenderfer	Sharpsville	8	H	10034	337.4
Jess & E. Smith	Jamestown	7	J	6560	326.8
A. E. Brown & Son	Greenville	15	J	6605	312.2
George W. Scott	Sharpsville	9	J	5887	304.8
Glen O. Melvin	Greenville	12	H	9576	304.0
Mifflin County, Mifflin Association					
Rufus H. King	Belleville	9	H	12335	417.2
S. M. Yoder	Allensville	12	H.G.	11352	407.7
A. C. Yoder	Allensville	13	G.H	9058	374.3
Rudy J. Yoder	Belleville	15	H	10744	373.7
J. B. Byler	Belleville	10	H	9987	367.2
U. K. Peachey	Belleville	8	H	11010	362.0
Elmer Yoder	Allensville	14	H	9870	353.3
H. H. Bradford	Lewistown	8	H	10477	352.7
Jacob T. Yoder	Belleville	9	H.J.G.	9509	350.6

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
David E. Peachey	Belleville	11	H	10620	342.7
B. R. Byler	Allensville	10	H	9525	338.3
S. C. Mitchell	Lewistown	7	H	9104	334.8
McClue Snyder	Lewistown	8	H	10565	331.3
R. F. Brown	Mill Creek	12	H	9051	330.0
Pius Kanagy	Belleville	17	H	9472	327.8
Fern Aurand	Lewistown	10	H	9149	309.6
W. J. Brown	Mill Creek	10	H	8648	308.5
Harvey P. Yoder	Belleville	10	G	7048	306.5
John O. Wirt	McVeytown	10	H.J.	8257	306.2
Montgomery County, Montgomery No. 1 Association					
Wm. H. Landis	East Greenville	19	H	11979	419.6
Levi Schultz Est.	Palm	13	H	10073	356.2
Compton Farm	Chestnut Hill	12	J	6215	349.4
Ursinus College	Collegeville	16	H	9714	335.1
Owen S. Gerhard	Palm	19	H	9611	334.6
W. C. F. Randolph	Royersford, R. D.	13	J	6177	331.3
H. D. Allebach & Son	Trappe	14	H	9231	329.2
C. Wm. Haywood	Ambler	20	J	6515	327.8
Camp Discharge Farm	Conshohocken	19	G	6774	323.7
O. M. Woodward & Sons.	Pennsburg, R. 1	9	BS	7739	309.8
L. K. Rothenberger	Worcester	8	H	9709	309.5
Willow Creek Farm	Penllyn	21	G	6774	307.7
J. L. Wood & Sons	Red Hill	22	H	8927	305.4
Warren G. Schultz	East Greenville	10	H	8528	303.8
Charles E. Longacre	Royersford, R. 1	10	H	8752	302.2
Mrs. Howard Bieler	East Greenville	14	H	8743	300.1
Montgomery County, Montgomery No. 2 Association					
Erdenheim Farm	Norristown, R. 4	14	J	6675	362.5
J. L. Overly & Sons	Red Hill	11	H	9634	335.0
Daniel Buckley	Broad Axe	7	G.H.	7131	319.1
Wm. Stephens	Collegeville	15	A	7820	317.4
State Hospital	Norristown	78	H	8537	310.3
Wm. Pratt	Willow Grove	23	H.J.	8168	309.1
C. E. Ingersoll	Penllyn	21	G	6137	308.5
Frank Brinckman	Red Mill	7	H	8555	305.0
Perry County, Perry Association					
James S. Beaver	Newport	13	H	10527	389.0
H. K. Kraft	Newport	7	G	6525	389.0
H. K. Stephens	Newport	7	H	10296	355.7
Geo. G. Beaver	Millerstown	13	H	8976	321.3
H. W. Dromgold	New Bloomfield	12	H	9036	305.8
Potter County, Ulysses Association					
H. H. Cooper	Ulysses	8	J	9720	534.6
Lawrence Buck	Ulysses	14	H	12518	438.5
C. M. Barker & Son	Ulysses	12	A	9016	405.2
Fred Bishop	Genesee	10	J	8013	400.2
E. B. Pride	Mills	7	H.G.	9794	391.2
J. L. Grom	Coudersport	11	J.H.A.	8554	382.4
Erway Bros.	Raymond	18	H	11334	374.3
N. J. Leete & Son	Coudersport	25	H	9393	350.0
Cleon Buck	Ulysses	12	H	9674	341.4
Harry B. Lent	Coudersport	13	H	8554	315.9
Lawrence Crowell	Ulysses	14	H	8737	306.2
Jonas Mulford	Ulysses	7	A.J.	7533	305.6
W. B. Bennitt	Ulysses	16	H	8849	304.2
Seth W. Morley	Gold	5	A.J.	6991	303.0
E. C. McElroy	Coudersport	9	A	7556	300.2
W. G. Potter	Coudersport	7	A	7183	300.0

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Schuylkill County, Schuylkill Association					
Christ Wagner & Son	Middleport	25	H	11578	407.1
Lewis E. Herring	Pine Grove, R. D.	13	J	7501	372.8
Earl Paxson	Schuylkill Haven, R. D.	12	H	9661	352.8
Roy J. Gauker	Cressona, R. D.	8	H	9687	350.0
Auburn Shale Brick Co.	Co. Auburn	17	H.J.	8964	346.9
C. W. Grube	Orwigsburg, R. D.	25	H.J.	9185	340.1
William F. Gombert	Andreas, R. D.	6	G	6748	339.2
Paul H. Lengel	Pine Grove	16	G.J.	6590	336.3
Roy Hunter	Lavelle	17	H.J.	9480	333.7
A. J. Fidler	Rock	11	G	6596	333.5
T. W. Lenger	Pine Grove	20	H	9049	329.1
Guy S. Reed	Summit Station, R. D.	13	H	9757	316.0
Robert C. Ludwig	Hegins	22	H	9055	315.1
Sch. Co. Almshouse	Schuylkill Haven	17	A	7795	310.5
Somerset County, Brothers Valley Association					
W. D. Glessner	Berlin, R. 5	11	S	8992	380.0
J. S. Glessner	Somerset, R. 1	10	H	9873	375.8
J. G. Suder	Berlin, R. 1	9	G	8915	369.0
G. S. Reiman	Berlin, R. 1	9	G	8361	367.2
F. H. Meyers	Berlin	15	G	7297	344.5
E. M. Knepper	Berlin	17	S.H.	8917	335.4
Ed. L. Hay	Meyersdale, R. 3	9	H	8346	315.0
S. D. Glessner	Berlin	9	H.G.	7478	305.1
R. W. Glessner	Berlin, R. 1	10	H	8629	304.9
J. Jacob Glessner	Berlin, R. 5	10	H.S.	7507	303.3
J. H. Countryman	Berlin	10	H.G.S.	7344	302.4
Sullivan County, Sullivan Association					
C. V. Driscoll	Dushore	10	H	12615	441.0
J. W. Adams	Sugar Run	8	H	12449	436.0
Thomas Doyle	Dushore	9	H	11183	391.2
J. P. Cook	Dushore	10	H	9390	360.1
Litzelman Bros.	Dushore	12	H	10118	358.7
S. O. Fulmer	Dushore	11	H	9996	344.5
W. E. Tubach	Dushore	13	H	9797	330.5
F. V. Rohe	Dushore	6	H	10747	328.0
Wm. Dibble	New Albany	14	H	8930	314.8
Milton Taylor	Muncy Valley	11	G	8382	300.5
Sullivan County, Western Sullivan Association					
Howard W. Plotts	Forksville	11	G	7230	379.1
Fred Shaffer	Forksville	11	H.BS.	8578	372.7
Curtis Baumunk	Forksville	11	H	9708	366.8
Walter Mulnix	Forksville	7	H.D.	8547	343.6
John Rogers	Forksville	7	G.H.	6972	332.9
Floyd E. Morgan	Wheelerville	8	H	7836	305.4
Susquehanna County, Gelatt—South Gibson Association					
A. L. Bowell	Thompson	9	H	12522	449.9
Hayden Bros.	Susquehanna	14	H	9255	326.8
F. F. Resseguie	So. Gibson	13	H	9245	326.8
Curtis Allen	Nicholson	14	H	9769	324.6
S. J. Horton & Son	Clifford	17	H	9050	322.9
Cordie Allen	Nicholson	16	H	9690	322.3
E. B. Gillett	Susquehanna	14	H	8064	312.6
C. F. Whitney & Son	Susquehanna	13	H	9299	302.7

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
Susquehanna County, West Susquehanna No. 1 Association					
R. L. Carter	Meshoppen	17	G	7964	381.0
W. H. Bush	Montrose, R D.	11	H	10534	365.4
H. D. & T. L. Brown	Montrose	27	H	9954	333.5
Claude Carter	W. Auburn	20	J	5866	311.8
R B. Williams	Lynn	28	H	9129	306.2
Tioga County, Jackson Association					
Dan Bly	Pine City, N. Y.	10	J.H.	9028	458.3
W. W. Deming	Millerton	21	J	7681	409.3
Frank Bly	Millerton	13	J	7279	395.8
L. V. Smith	Millerton	12	G	7884	384.5
Victor Hurd	Millerton	19	H.J.	8146	365.3
Fred Bower	Pine City, N. Y.	12	J.H.	9088	361.5
L. R. Tillinghast	Gillett	14	A.H.	10435	355.9
J. A. Seeley	Millerton	9	H.J.	8669	350.7
L. L. Daggett	Millerton	15	Mixed	8544	350.1
Ford Cady	Pine City, N. Y.	16	H.J.	9302	349.1
Fred F. Tillinghast	Gillett	14	J	6538	343.9
Noel Card	Lawrenceville	13	J	6769	343.6
O. W. Wheeler	Lawrenceville	13	J	6761	327.0
E. B. Spencer	Millerton	21	H	9217	318.7
John P. Casper	Pine City, N. Y.	20	H.J.	8110	309.7
A. G. Miller	Pine City, N. Y.	22	H	8561	308.7
Charles Antes	Pine City, N. Y.	14	A	7430	308.4
Tioga County, Cowanesque Association					
Giles Thomas	Westfield	15		9776	337.3
H. L. Seeley	Academy Corner	20		8168	305.3
F. J. Wood	Knoxville	13		9019	302.7
Tioga County, Wellsboro Association					
Roy S. Bowen	Wellsboro	8	H	20400	656.5
Gale C. Gerow	Wellsboro	10	H	12775	424.8
Fred C. Erway	Wellsboro	16	H	12854	415.0
Ralph W. Sampson	Crooked Creek	13	H	11345	404.3
E. C. Howell	Wellsboro	9	H	10782	400.0
Claude Carpenter	Crooked Creek	21	H	10446	369.1
O. W. Butler	Wellsboro	13	G	8002	366.4
James L. Warren	Wellsboro	13	H.J.	10014	358.5
Perley W. Lawton	Tiadaghton	9	H	10069	358.1
Leon Torpey	Wellsboro	16	A.G.	8381	356.7
T. J. Erway	Wellsboro	11	H	10139	344.5
Burr A. Dewey	Mansfield	17	H.J.	9310	334.7
Homer G. Webster	Wellsboro	19	H.A.	8755	306.7
Union County, Buffalo Valley Association					
A. C. Slifer	Lewisburg, R. 3	6	H	12646	459.0
A. D. Beaver	Vicksburg	6	H	12520	458.1
J. E. Boyer	Lewisburg, R. 1	8	H	13528	454.0
H. K. Benner	Vicksburg	9	H	12115	424.7
Fred D. Dock	Lewisburg, R. 1	13	H	11842	418.2
H. A. Walter	Lewisburg, R. 1	12	H	11796	405.0
C. E. Erdley	Lewisburg, R. 1	16	H	12404	399.3
W. J. Erdley	Mifflinburg, R. 3	9	H	11877	397.2
W. S. Erdley	Lewisburg, R. 3	12	H	11348	387.8
J. L. Reitz	Lewisburg, R. 3	18	H	10202	373.5
J. S. Wehr	Mifflinburg, R. 3	11	H	11381	369.0
P. C. Moser	Lewisburg, R. 4	9	H	10602	368.1
R. E. Musser	Lewisburg, R. 3	11	H	9669	360.0

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
P. W. Young	Lewisburg, R. 3	8	H	9940	356.9
J. A. Roush	Winfield	14	H	9747	346.0
J. S. Zeigler	Lewisburg, R. 4	12	H	10038	345.1
H. H. Moll	Millmont	11	H	8440	331.0
J. S. Hackenberg	Lewisburg, R. 3	14	H	9407	322.3
Oscar Brouse	Mifflinburg, R. 1	7	Sw.	7977	321.1
Geo. B. Frederick	Lewisburg, R. 3	17	H	9239	318.6
J. M. Erdley	Lewisburg, R 1	13	H	8923	314.5
R. B. Eberhart	Winfield	6	H.G	7802	311.6
Clark S. Miller	Lewisburg, R. 3	16	H	8529	307.7
Venango County, Venango Association					
Polk State School	Polk	102	H	11896	420.4
River Ridge Farm	Franklin	7	J	5932	385.0
R. G. McMurray	Utica	14	J.G.	7451	384.1
R. J. McCoy	Emlenton	10	J	6409	348.4
Rosemont Farm	Franklin	26	J	5770	320.8
Mark McKinley	Cochranton, R. 4	9	H.G.J.	7284	310.9
Peter Kiter	Utica	10	H.J.	6594	301.7
Warren County, Warren Association					
Warren State Hosp	Warren	76		12713	436.5
Leo Cornish	Bear Lake	12		9363	398.4
B. E. Firth	Russell	13		9758	375.9
Mrs. B. D. Hitchcock	Sugar Grove	15		6826	348.9
A. F. Dyke	Warren	16		7523	348.4
Homer Lindell	Russell	12		7488	343.3
E D. Wetmore	Warren	46		8438	324.7
S. C. Hitchcock	Russell	14		6625	323.6
Paul Lindell	Akeley	17		8605	317.7
Rouse Hospital	Youngsville	37		8680	310.3
Amandus Larson	Ridgway	12		7858	310.3
F. C. Wilcox	Akeley	16		6867	308.7
Andrew Johnson	Corry	20		8490	304.3
H. A. Ludwick	Akeley	19		8198	301.1
Washington County, Washington Association					
Lloyd D. Linn	Washington, R. 9	13	H.J.	10857	392.3
H. W. Sumney	Bentleyville	10	J	7270	380.2
P. F. Morris	Charleroi	15	J	7171	365.3
Irwin & Liggett	Rea	40	H.J.G.	8538	360.2
B. B. Wilson	Washington, R. 3	12	H.J.	7808	315.6
Oscar Devore	Thomas	12	H	9618	312.2
J. A. Dinsmore	Washington, R. 9	24	J	6154	312.0
A. L. McCracken & Son	Charleroi	13	J	6510	304.7
McClelland Bros.	Canonsburg, R. 2	20	H	9775	303.6
Penna. Training Sch.	Morganza	39	H.J.	7395	300.8
Wayne County, Wayne Association					
S. O. Snedeker	Waymart, R. 1	13	J	7557	409.4
G. W. Hauenstein	Waymart, R. 1	17	J	7986	402.4
George Rosener	Aldenville	11	J	7996	401.2
Clarence Moase	Pleasant Mount	11	H	11199	397.9
R. G. Erk	Prompton	30	J.H.	8218	373.3
Freeman Lester	Seelyville	9	H.G	9636	369.4
C. T. Box	Honesdale, R. 3	8	J	6873	368.3
H. A. Robinson	Seelyville	9	J	7511	363.2
Homestead Farms	Honesdale	60	G	7390	362.7
Friend Rosener	Aldenville	12	J	6809	357.2
George Erk	Seelyville	32	J	6211	340.5
W. F. Hauenstein	Waymart, R. 1	18	H.J.	7019	338.5

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
E. H. Ledyard, Jr	Waymart, R. 1	21	J	6134	332.5
J. Russell Spencer	Pleasant Mt.	17	H	8596	318.7
Edward E. Welch	Seelyville	9	A.J.	7242	314.4
R. A. Trevethan	Honesdale, R. 1	19	H.J.	8312	312.3
T. B. Clark	Honesdale, R. 1	17	H	8674	311.5
G. Smith & Sons	Seelyville	24	J	5762	309.3
Westmoreland County, Westmoreland No. 1 Association					
E. H. Kemp	Greensburg, R. 4	13	G.J.H.	8775	372.5
F. M. Kintigh	Irwin, R. 2	11	A.G.H	8591	359.7
John Moffat	New Alexandria	8	G	8576	350.4
Logan F. Blank	Jeannette, R. 1	16	G.H.	8436	348.6
A. M. Johnson, Mrs.	Greensburg, R. 4	13	A.H.	9148	341.8
Homer C. Waugaman	Greensburg, R. 4	12	J.H.G.	8768	333.5
Floyd I. Shirey	Latrobe	18	H	9726	328.0
St. Vincent's Arch.	Latrobe	25	H	9343	326.4
D. L. Saul	Greensburg, R. 4	10	H	8314	322.3
J. H. Seanor	New Alexandria	19	H.J.G	8206	316.1
Paul A. Hugus	Latrobe, R. 3	26	H.J	7964	311.8
C. R. Waugaman	Greensburg, R. 4	15	H.G.	7612	301.1
Westmoreland County, Westmoreland No. 2 Association					
I. C. Wohlwend	Salina	8	BS	11230	442.7
John W. Menk	Parnassus	8	H	10239	369.5
Henry Schafer & Son	Parnassus, R. 1	8	H.J.	8621	349.6
George Leeman	Leechburg	20	H.J.	8893	347.8
J. M. & C. A. Lemon	Saltsburg	12	H.G.	9160	338.3
A. L. Myers	Parnassus	9	H.J.	7484	315.6
A. A. Leslie	Arnold	14	H.G.	8291	310.9
L. White & Son	Parnassus, R. 1	20	H	9252	300.1
Westmoreland County, Westmoreland No. 3 Association					
E. G. Summy	Mt. Pleasant	14	H	10355	371.7
Harry Cole	Greensburg	8	H.J.	8706	360.8
J. M. Leighty	Tarrs	17	J.H.G.	8282	350.6
J. E. Wineman	Youngwood	16	H	10085	341.3
G. R. Funk	Hunker	14	H.J.	8619	329.6
Warren Hillis	Armbrust	6	G	5912	317.6
H. S. Mathias & Son	Irwin	20	H	8878	313.5
Brooks Horner	Mt. Pleasant	11	G.H.	7452	300.3
York County, Northern York Association					
Norman E. Rishel	York, No. 8	13	H	11478	392.3
J. Raymond Arnold	Hellam	42	G	7420	360.4
C. J. King	Mt. Wolf	6	G	7052	357.0
J. A. Poorbaugh	York, No. 3	30	G	7720	354.5
J. J. Hamme	Abbotstown	8	G	6678	352.4
C. Allen May	Dover	15	G	7156	350.9
Walter W. Little	Hanover	13	G	7684	343.8
H. M. & M. B. Emig	Hellam	9	H.G.	7878	325.2
Frank L. Krall	East Berlin	17	G	9502	323.4
T. G. Cooke	Dillsburg	9	H.G.	7331	319.9
W. F. Dummer	Mt. Wolf	11	H.G.	8520	317.5
Elmer Eichelberger	Lewisberry	8	H	9116	311.6
York County, Southern York Association					
J. R. Showalter	Woodbine	29	H.G.	9914	369.1
J. S. Murphy	Woodbine	16	H	10500	350.8
W. S. Grimm	Red Lion	30	H	10114	344.3
G. W. Wambaugh	Delta	15	H.G.	7904	344.3
N. S. Sellers	Lineboro	6	G.H.J.	8853	337.8
Dale D. Kilgore	Woodbine	10	G.H.	8219	333.8
E. C. Wiley	Delta	9	G.H.	7850	327.3

Name	Address	Ave. No. of cows	Breed	Lbs. milk	Lbs. butterfat
D. R. Posey	Woodbine	14	G.H.	8970	327.3
C. E. Fridinger	Lineboro, Md.	7	G.H.	9019	320.5
H. Lyle Hess	Delta	13	G	6804	318.3
M. E. Webb	Fawn Grove	23	G	6817	313.5
Clyde Snodgrass	High Rock	14	H	8802	303.4

End of Volume